Examination Outline Cross-reference:	Question #	1 (SRO)
	Tier #	1
	Group #	1
	K/A #	001.AK3.02
	Importance Rating	4.3

Proposed Question:
With the plant at 50% power, the following sequence of events occurs:

1. A single Control Bank "D" rod starts to withdraw with no demand signal present.
2. The RO places the rod bank selector switch in MANUAL, and the rod motion stops.
3. The US enters AOP 3552 "Malfunction of the Rod Drive System".
4. The SM refers to Technical Specification section 3/4.1.3 "Movable Control Assemblies".

What is one of the items ensured by the specifications of section 3/4.1.3?

A. Acceptable power distribution limits are maintained.

B. DNBR is maintained within its assumed steady state envelope of operation.

C. Power defect remains within design limits during operation.

D. Moderator Temperature Coefficient remains within its analyzed range.

Proposed Answer: A

Explanation (Optional):
The movable control assemblies section of Technical Specifications ensures that: 1) acceptable power distribution limits are maintained ("A" correct). 2) minimum SHUTDOWN MARGIN is maintained. 3) potential effects of rod misalignment on associated accident analysis are limited ("B", "C" and "D" wrong). "B" is the basis of section 3/4.2.5 "DNB Parameters". "D" is a basis for section 3/4.1.1.4 "Minimum Temperature for Criticality".

Technical Reference(s): Tech .Spec. 3/4.1.3 Basis (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05478 Describe the major administrative or procedural precautions and limitations placed on the operation of the Rod Control System, and the basis for each.

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.43.2
Comments:

Examination Outline Cross-reference:		
	Question #	2
	Tier #	1
	Group #	1
	K/A #	003.AK1.19
	Importance Rating	2.9

Proposed Question:
Initial conditions:

- The Plant has been steady at 80% power for several days.
- The core is at middle of life conditions.
- Control bank D rods are at 170 steps.

The following sequence of events occurs:

1. One Shutdown Bank A rod drops into the core.
2. The dropped rod adds -100 pcm of reactivity.
3. The operators fail to take rods to MANUAL
4. Bank D rods withdraw 25 steps and restore Tave to program.

What would have been the results if initial control bank D rod height had been 200 steps?

A. Rods would withdraw 28 steps, and **would** restore Tave to program.

B. Rods would withdraw 28 steps, and **would not** restore Tave to program.

C. Rods would withdraw 23 steps, and **would not** restore Tave to program.

D. Rods would withdraw 18 steps, and **would** restore Tave to program.

Proposed Answer: C
Explanation (Optional): When the rod drops, reactor power will decrease, and Tave will decrease since steam demand has not changed. This results in rods moving out, restoring temperature. Differential rod worth for rods below 200 steps is approximately 4 pcm/step. Above 200 steps, differential rod worth is approximately 3 pcm/step, requiring rods to move out about 33 steps ("A" and "D" wrong). Automatic rod withdrawal is blocked at 223 steps by C-11 ("C" correct, "B" wrong).

Technical Reference(s): Differential Rod Worth Curve RE-D-02; Monthly Reactivity Data Sheet (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-000015 Given one of the below listed failures (partial or complete) of the Rod Control System, determine the effects on the system and on interrelated systems... Dropped Rod...

Question Source: New

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.5

Comments:

Examination Outline Cross-reference:		
	Question #	3
	Tier #	1
	Group #	1
	K/A #	005.AK2.02
	Importance Rating	2.6

Proposed Question:
With the plant initially at 100% power, the following sequence of events occurs:

1. A Control Bank "C" Group 1 rod drops.
2. The crew prepares to recover the rod.
3. The US directs the RO to operate the ROD DISCONNECT switches in accordance with AOP 3552 "Malfunction of the Rod Drive System".

The RO reports that he placed the lift coil disconnect switches for the unaffected rods in Control Bank "C" Group 1 in the ROD DISCONNECTED position, and left the switch for the dropped rod in the ROD CONNECTED position.

Which of the following actions should be taken?

A. Continue to recover the dropped rod in accordance with the procedure.

B. Direct the RO to also place all Control Bank "C" Group 2 rods in ROD DISCONNECTED.

C. Direct the RO to place the dropped rod disconnect switch in ROD DISCONNECTED and return the group 1 rods to ROD CONNECTED.

D. Direct the RO to place the Group 2 rods and the dropped rod disconnect switches in ROD DISCONNECTED and return the Group 1 rods to ROD CONNECTED.

Proposed Answer: B
Explanation (Optional): Step in procedure states, "EXCEPT for the dropped rod, place all the lift coil disconnect switches for the affected bank to - ROD DISCONNECTED". A incorrect the Group 2 rods also must be switched. B correct, group 2 rods to ROD DISCONNECTED. C incorrect, step states unaffected rods placed in ROD DISCONNECTED. D incorrect, group 1 rods, except dropped rod to remain in DISCONNECTED.
Technical Reference(s): AOP 3552, Attachment A, step 5.
Proposed references to be provided to applicants during examination: None
Learning Objective: MC-03901 Describe the major action categories contained within AOP 3552.
Question Source: Bank # 75456
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.7
Comments:

Examination Outline Cross-reference:	Question #	4
	Tier #	1
	Group #	1
	K/A #	011.EK1.01
	Importance Rating	4.4

Proposed Question:
Current conditions:

- The crew is responding to a large break LOCA per E-1, "Loss of Reactor or Secondary Coolant".
- RCS pressure is stable at 200 psia.
- All ECCS pumps are running.

What currently is the primary method of decay heat removal?

A. Heat transfer between the RCS and the S/Gs due to subcooled natural circulation flow.

B. Condensation of reflux boiling in the S/Gs, flowing back to the vessel via the hot legs.

C. Injection of ECCS water from the RWST and the removal of steam/water out of the break.

D. Injection of water from the CTMT sump and the removal of steam/water out of the break.

Proposed Answer: C

Explanation (Optional):
"A" and "B" incorrect, since during a large break LOCA, the SGs are at higher temperatures than the RCS steam/water mixture. "A" and "B" are plausible since natural circulation is a vital cooling mechanism during small break LOCAs. "C" is correct, since during large break LOCAs, the break is large enough to remove all of the decay heat from the core. "D" is wrong, since the switchover to cold leg recirculation is not performed until the RHR pumps have tripped.

Technical Reference(s): E-1 background (Attach if not previously provided)
ES-1.3, step 2.

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04912 For a Large Break LOCA, EXPLAIN Core Cooling during the 4 major stages of the Event... (As available)

Question Source: Modified Bank # 70054 Parent attached

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.5, 41.8, and 41.10

Comments:

Original 70054

Given the following conditions:

- A LOCA has occurred.
- Appropriate actions in accordance with E-0, "Reactor Trip and Safety Injection", and E-1, "Loss of Reactor or Secondary Coolant", have been completed.
- ECCS is operating in cold leg recirculation mode.
- RCS pressure is stable at 200 psia.

Which of the following statements describes the primary method of decay heat removal?

A. The condensation of reflux boiling in the S/Gs.

B. Heat transfer between the RCS and the S/Gs due to natural circulation flow

C. Heat transfer between the RCS and the S/Gs due to forced circulation flow

D. The injection of water from the containment sump and the removal of steam/water out from the break.

Answer: D

Examination Outline Cross-reference:	Question #	5 (SRO)
	Tier #	1
	Group #	1
	K/A #	W/E04.EA2.01
	Importance Rating	4.3

Proposed Question:
With the plant at 100% power, the following sequence of events occurs:

1. The reactor trips and safety injection actuates.
2. Over the next 10 minutes, RCS pressure decreases to and stabilizes at 1600 psia.
3. The crew is responding using ECA-1.2, "LOCA Outside Containment".
4. While attempting to isolate the break, the final valve the crew closes is the "A" RHR pump cold leg injection valve 3SIL*MV8809A.
5. After 3SIL*MV8809A closes, RCS pressure starts increasing.

Which procedure will the crew transition to from ECA-1.2?

A. E-1 "Loss of Reactor or Secondary Coolant".

B. ES-1.1 "SI Termination".

C. ES-1.2 "Post LOCA Cooldown and Depressurization".

D. ECA-1.1 "Loss of Emergency Coolant Recirculation".

Proposed Answer: A

Explanation (Optional):
JUSTIFICATION: It can be determined that the break is isolated since RCS pressure increases. "A" is correct, and "B" is wrong, but plausible, since with the break isolated, the crew transitions to E-1 and subsequently to ES-1.1. "B" is plausible since with the leak isolated, this procedure will be used to terminate SI. "C" is wrong because there is no entry into ES-1.2 from ECA-1.2. "C" is plausible since the break size is small, and ES-1.2 is designed to mitigate small break LOCAs. "D" is wrong, since if the break is isolated, the crew would transition to ECA-1.1.

Technical Reference(s): ECA-1.2, steps 4 and 5 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: 03878, Discuss conditions which require transition to other procedures from EOP 35 ECA-1.2. (As available)

Question Source: Modified Bank # 75669

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Original question 75669

With the plant at 100% power, the following sequence of events occurs:

1. The reactor trips and safety injection actuates.
2. Over the next 10 minutes, RCS pressure decreases to and stabilizes at 1600 psia.
3. The crew is responding using ECA-1.2, "LOCA Outside Containment."
4. While attempting to isolate the break, the final valve the crew closes in attempt to isolate the leak is RHR pump "A" cold leg injection valve (3SIL*MV8809A).
5. After 3SIL*MV8809A closes, RCS pressure remains stable.

Which procedure will the crew transition to from ECA-1.2?

A. E-1 "Loss of Reactor or Secondary Coolant".

B. ES-1.1 "SI Termination".

C. ES-1.2 "Post LOCA Cooldown and Depressurization".

D. ECA-1.1 "Loss of Emergency Coolant Recirculation".

Answer: D

Examination Outline Cross-reference:	Question #	6 (SRO)
	Tier #	1
	Group #	1
	K/A #	W/E01.EK1.03
	Importance Rating	3.5

Proposed Question:
Initial conditions:

- The plant tripped due to a fault in the "A" SG.
- The crew has isolated the SG per E-2 "Faulted Steam Generator Isolation".
- The crew has just transitioned to ES-1.1 "SI Termination".

The following sequence of events occurs:

1. RCS Pressure starts decreasing.
2. Numerous Auxiliary Building radiation monitors go into alarm.
3. The US desires to enter ES-0.0 "Rediagnosis".

Based on current conditions, what action will the crew take?

A. The crew will NOT enter ES-0.0, since SIS has already actuated.

B. The crew will NOT enter ES-0.0, since E-0 has already been exited.

C. The crew will perform ES-0.0 and then transition to ECA-1.2 "LOCA Outside Containment".

D. The crew will perform ES-0.0 and then transition to E-2 "Faulted Steam Generator Isolation".

Proposed Answer: C
Explanation (Optional): Rediagnosis can only be used if SI is actuated ("A" wrong) after exiting E-0 ("B" wrong). ES-0.0 will send the crew to an E-1 series procedure since the faulted SG has already been isolated ("D" wrong) and a SGTR is not occurring ("C" correct).

Technical Reference(s): OP 3272, section 1.2, pg 6 (Attach if not previously provided)
ES-0.0 Rediagnosis

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04451 Discuss the conditions under which ES-0.0 can be used. (As available)
MC-06275 Describe the major action categories within ES-0.0.

Question Source: New
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.8, 41.10
55.43.5

Comments:

Examination Outline Cross-reference:	Question #	7 (SRO)
	Tier #	1
	Group #	1
	K/A #	015/17.AK1.02
	Importance Rating	4.1

Proposed Question:
Current Conditions:

- The plant is at 30% power.
- "RCP HI RANGE LKG FLOW HI" annunciator is lit on Main Board 3.
- "B" RCP #1 seal leakoff flow is 6.8 gallons per minute.
- Both "B" RCP #1 seal inlet temperature indicators read 113°F and increasing.

What actions are the crew directed to take?

A. Trip the reactor, stop the "B" RCP, and close its number 1 seal leakoff valve after the pump has been stopped for between 3 to 5 minutes.

B. Commence an orderly plant shutdown, and remove the "B" RCP from service within 8 hours.

C. Continue to monitor the "B" RCP, and request Engineering to evaluate the pump for continued operation.

D. Transition to AOP 3554 "RCP Trip or Stopping an RCP at Power" and initiate action to perform an immediate shutdown of the "B" RCP.

Proposed Answer: D
Explanation (Optional): With RCP #1 seal leakoff flow >6 gpm AND #1 seal inlet temperatures increasing, MB3B 2-10 (Leakoff Flow high) directs the crew to AOP 3554 with power less than 37% (P-8), since the RCP can be stopped without tripping the unit ("A" is wrong). "A" is plausible since this would be the correct action if power was >P-8. OP 3554 requires tripping the RCP and closing the seal leakoff valve at least 3 minutes after the pump trip ("D" is correct). "B" is wrong, but plausible, since these actions would be required if seal inlet temperature is stable. "C" is wrong, and plausible, since these actions are required if seal leakoff flow was $\leq$ 6 gpm with seal inlet temperatures stable.

Technical Reference(s): OP3353.MB3B 2-10 (Attach if not previously provided)
Proposed references to be provided to applicants during examination: None
Learning Objective: MC-03905 IDENTIFY plant conditions that require entry into AOP-3554.
Question Source: Bank # 64317
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.10
55.43.5
Comments:

Examination Outline Cross-reference:		
	Question #	8
	Tier #	1
	Group #	1
	K/A #	W/E10.EK1.02
	Importance Rating	3.6

Proposed Question:
What strategy is used in ES-0.4, "Natural Circulation with Steam Void in Vessel (without RVLMS)," to prevent excessive void growth?

A. During RCS depressurization steps where void growth is possible, RCS temperature is held constant, and charging and letdown flows are equalized.

B. During RCS cooldown steps where void growth is possible, RCS pressure is held constant, and charging and letdown flows are equalized.

C. RCS Cooldown rate is limited to 50°F/hr based on WR cold leg temperature.

D. RCS subcooling is limited to a minimum of 132°F based on core exit TCs.

Proposed Answer: A

Explanation (Optional):
"A" is correct, since void growth occurs during depressurization steps when RCS pressure drops less than saturation pressure for head temperature. With charging and letdown matched, all PZR level increases are due to void growth, and PZR level it kept < 91%. "B" is wrong, since during cooldown steps, PZR level is maintained stable via charging to make up for shrinkage. "C" is wrong, since cooldown rate limit in ES-0.4 is 80°F/hr. "C" is plausible, since ES-0.2 "Natural Circulation Cooldown" limits cooldown rate to 50°F/hr to prevent void formation. "D" is wrong, since subcooling is maintained via discrete cooldown depressurization steps in ES-0.4. "D" is plausible, since ES-0.2 limits subcooling to 132°F to prevent void formation.

Technical Reference(s): ES-0.4, steps 12-15

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05943 Describe the major action categories within EOP 35 ES-0.4, Natural Circulation Cooldown with Steam Voids in Vessel (w/o RVLMS).

Question Source: Bank # 67599

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.8, 41.10

Comments:

Examination Outline Cross-reference:		
	Question #	9
	Tier #	1
	Group #	1
	K/A #	024.AK2.04
	Importance Rating	2.5

Proposed Question:
With the plant at 100% power, the following sequence of events occurs:

1. An unexplained positive reactivity addition event occurs.
2. The crew enters AOP 3566 "Immediate Boration".
3. The RO reports that neither boric acid pump will start.
4. The RO opens both gravity feed boration valves.
5. The RO reports that net charging flow (Charging + Seal Injection - RCP Seal Return) is 80 gpm.

What action is the crew required to take?

A. Open emergency boration valve 3CHS*MV8104.

B. Decrease net charging flow to less than 75 gpm.

C. Throttle open the charging line flow control valve to increase flow to greater than 100 gpm.

D. Open both RWST to charging pump suction valves and one charging header SI valve.

Proposed Answer: B

Explanation (Optional):
"B" is correct since when neither boric acid pump will start, charging flow is limited to < 75 gpm to prevent the loss of charging pump suction due to limited suction source. "A" is wrong, but plausible, since this action is taken if the crew had been able to start a boric acid pump. "C" and "D" are wrong, but plausible, since flow is aligned to the RWST and increased to > 100 gpm if boration flow is < 33 gpm.

Technical Reference(s): AOP 3566, steps 1 and 3. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03961, Describe the major action categories contained within AOP-3566, Immediate Boration. (As available)

Question Source: New

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.7, 41.8
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	10
	Tier #	1
	Group #	1
	K/A #	026.AA2.05
	Importance Rating	2.5

Proposed Question:
With the plant at 100% power, an "RPCCW SPLY FLOW HI" annunciator is received on MB1. The crew enters AOP 3561 "Loss of Reactor Plant Component Cooling Water", and the RO reports RPCCW flow rates and surge tank levels are as follows:

	"A" Train	"B" Train
Safety Header:	0 gpm	2000 gpm
Non-Safety Header:	2000 gpm	2000 gpm
CTMT Header:	700 gpm	1450 gpm and increasing
Surge Tank Level	92.5% and decreasing (Both trains)	

Have RPCCW heat exchanger flow limits been exceeded, and what is a potential source of the leak?

A. The heat exchanger flow limits have been exceeded. A potential source of leakage is the "C" RCP Thermal Barrier Heat Exchanger.

B. The heat exchanger flow limits have been exceeded. A potential source of leakage is the Seal Water Heat Exchanger.

C. The heat exchanger flow limits have not been exceeded. A potential source of leakage is the "C" RCP Thermal Barrier Heat Exchanger.

D. The heat exchanger flow limits have not been exceeded. A potential source of leakage is the Seal Water Heat Exchanger.

Proposed Answer: D
Explanation (Optional): The "B" RPCCW heat exchanger flow rate is 5450 gpm, which is below the limit of 8100 gpm ("A" and "B" wrong). Both the seal water heat exchanger and the "C" RCP are cooled from the "B" Train RPCCW CTMT Header, but thermal barrier pressure is greater than RPCCW pressure, which would result in surge tank level increasing ("C" wrong, "D" correct).
Technical Reference(s): OP3353.MB1C, 4-7 (Attach if not previously provided)
P&ID 121A and B

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04154 Describe the operation of the RPCCW system under the following:... CCP System Leak... (As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.8 55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	11
	Tier #	1
	Group #	1
	K/A #	029.EK1.03
	Importance Rating	3.8

Proposed Question:
The crew is progressing through EOP FR-S.1 "Response To Nuclear Power Generation/ATWS" and at step 6 "Verify Boration Flow" the RO has been directed to check pressurizer pressure less than 2350 psia.

The RO reports PZR pressure is 2360 and stable.

What action will FR-S.1 direct the crew to take, and why?

A. Start a second charging pump if only one is running, in order to increase the negative reactivity added by boron injection

B. Open PORVs as necessary until PZR pressure is less than 2150 psia, in order to increase the negative reactivity added by boron injection

C. Verify both PORVs are open, in order to minimize the pressure transient on the RCS.

D. Verify all three PZR safety valves are open, in order to minimize the pressure transient on the RCS.

Proposed Answer: B
Explanation (Optional): The Westinghouse background states: "The check on RCS pressure is intended to alert the operator to a condition which would reduce charging or SI pump injection into the RCS and, therefore, boration ("C" and "D" wrong). The PZR PORV setpoint is chosen as that pressure at which flow into the RCS is insufficient." FR-S.1 directs the operators to open PORVs as necessary to lower PZR pressure to less than 2150 psia ("B" correct, A wrong). "C" and "D" are plausible, since RCS overpressure is the limiting event for the worst case ATWS.
Technical Reference(s): WOG Bkgd Doc for FR-S.1 step 4 (Attach if not previously provided)
FR-S.1, step 6.

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04626 Discuss the basis of major procedure steps and/or sequence of steps in EOP 35 FR-S.1. (As available)

Question Source: Bank #75459
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.8, 41.10
Comments:

Examination Outline Cross-reference:	Question #	12
	Tier #	1
	Group #	1
	K/A #	040.AK2.02
	Importance Rating	2.6

Proposed Question:

PARAMETER:	CURRENT VALUE:	TREND:
Reactor power	58%	Increasing
RCS pressure	2225 PSIA	Decreasing
Auctioneered high Tavg	569°F	Decreasing
Turbine power	595 MWE	Decreasing
S/G NR levels	52%	Increasing
Steam pressure	1030 PSIG	Decreasing
Containment pressure	15 PSIA	Increasing

Based on the plant conditions, which of the following events is in progress?

A. Small RCS LOCA

B. Steamline break

C. RCS dilution event

D. Steam generator tube rupture

Proposed Answer: B

Explanation (Optional):
Reactor power is increasing, indicating positive reactivity event ("A" and "D" wrong). Steam pressure and electric load is decreasing, indicating loss of steam to the turbine ("B" correct, "C" wrong).

Technical Reference(s): FSAR Chapter 15.1.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04881 DESCRIBE the major parameter changes associated with increased heat removal by the Secondary System. (As available)

Question Source: Bank # 64268

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.7

Comments:

Examination Outline Cross-reference:	Question #	13
	Tier #	1
	Group #	1
	K/A #	W/E08.GEN.2.4.18
	Importance Rating	3.6

Proposed Question:
While responding to a pressurized thermal shock (PTS) condition in accordance with FR-P.1, the Operator is directed to check if ECCS can be terminated.

What is the bases for terminating ECCS in this condition?

A. SI flow may have contributed to the RCS cooldown, and may cause excessive cycling of the pressurizer PORVs.

B. SI flow may have contributed to thermal stresses in the reactor vessel Thot & Tcold nozzles, and may cause excessive cycling of the pressurizer PORVs.

C. SI flow may have contributed to the RCS cooldown, or may prevent a subsequent RCS pressure reduction.

D. SI flow may have contributed to thermal stresses in the reactor vessel Thot & Tcold nozzles, or may prevent a subsequent RCS pressure reduction.

Proposed Answer: C

Explanation (Optional):
SI flow may have contributed to the RCS cooldown, and may prevent a subsequent RCS pressure reduction ("C" correct). Excessive PORV cycling is not the major concern ("A" and "B" wrong), and the vessel downcomer is the area of greatest concern during a PTS event ("B" and "D" wrong).

Technical Reference(s): WOG Bkgd FR-P.1, step 6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04553 Discuss the basis of major procedure steps and/or sequence of steps in EOP 35 FR-P.1. (As available)

Question Source: Bank # 65033

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.10

Comments:

Examination Outline Cross-reference:		
	Question #	14
	Tier #	1
	Group #	1
	K/A #	W/E08.EK1.3
	Importance Rating	4.0

Proposed Question:
A large steam break occurs inside CTMT on the "B" and "C" SGs. Current conditions are as follows:

- "A" and "D" SG narrow range levels are 15%
- AFW flow is 100 GPM to the "A" and "D" SGs
- The "A" and "D" SG "STEAMLINE PRESSURE LO" and "LEVEL LO-LO" annunciators are lit on Main Board 5.
- The crew is in FR-P.1 "Response to Imminent Pressurized Thermal Shock Condition"
- RCS temperature and pressure are stable
- Only the control group of pressurizer heaters energized

The crew has determined a 1 hour soak is required.

Which of the following evolutions could be performed by the crew in the next hour?

A. Energize additional pressurizer heaters.

B. Place auxiliary spray in service.

C. Increase AFW flow to 300GPM each to the "A" and "D" SGs.

D. Place RHR in service and cooldown the RCS at 20°F/hour.

Proposed Answer: B

Explanation (Optional):
"B" is correct, since soak requirements do not prohibit lowering RCS pressure. "A" is wrong since pressure can not be raised, and "C" and "D" are wrong, since temperature can not be lowered.

Technical Reference(s): FR-P.1, step 23 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04552 Describe the major action categories within EOP 35 FR-P.1. (As available)

Question Source: 1997 Millstone 3 NRC SRO exam #88
Question History: 1997 Millstone 3 NRC SRO exam

Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.8, 41.10
Comments:

Examination Outline Cross-reference:	Question #	15 (SRO)
	Tier #	1
	Group #	1
	K/A #	PLANT SPECIFIC
	Importance Rating	N/A

Proposed Question:
With the unit at full power, the following sequence of events occurs:

- CONVEX orders a load reduction from Millstone Station due to a transmission system emergency.
- Unit 3 is directed to reduce total generation by 760 MWe (to 440 MWe) in the next 15 minutes.
- The Crew enters AOP 3575, "Rapid Downpower," and commences reducing generator load accordingly.
- The Crew has just initiated the required boration for this load reduction from the BAT tanks.
- Direct Boric Acid flow as read on 3CHS-FI183A is 75 gpm.

How many gallons of Boric Acid should be added to the RCS to support this load reduction and how long should the boration last?

A. Borate approximately 550 gal. of Boric Acid.
Boration should last for 7.3 minutes.

B. Borate approximately 550 gal. of Boric Acid.
Boration should last for 15 minutes.

C. Borate approximately 950 gal. of Boric Acid.
Boration should last for 12.7 minutes.

D. Borate approximately 950 gal. of Boric Acid.
Boration should last for 15 minutes.

Proposed Answer: C

Explanation (Optional):
Per Step 1 of AOP 3575 all CONVEX requested load reductions shall be performed at 5%/min. Step 5 has the operator borate using a BAT pump via MV8104 from the BAT tanks. The total amount of boration per Step 5.h is:
Total Boration (gal) = [Total Power Change (Δ%)] x [15(gal/%)]
Total Boration (gal) = [(760 MWe)/1200 MWe x 100%] x [15 gal/%] = 950 gal. of Boric Acid. Per Step 5.i the boration should last for: Time = [Total Boration (gal)] / [Direct Boric Acid Flowrate (gpm)]. Time = [950 gal.] / [75 gpm] = 12.7 min. "C" is correct. All others are incorrect. 550 gallons is plausible since this is the value obtained if the calculation is performed using the final power level of 440 MWe, rather than the change in power. 15 minutes is plausible since this is the time in which the crew is requested to complete the downpower.

Technical Reference(s): AOP 3575, steps 1 and 5 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03982 Describe the major action categories contained within AOP-3575. (As available)

Question Source: Bank # 70168

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	16
	Tier #	1
	Group #	1
	K/A #	055.EA2.03
	Importance Rating	4.7

Proposed Question:
With the plant operating at 100%, a total loss of offsite power occurs. The crew has entered ECA-0.0, "Loss of All AC Power".

After 15 minutes, the SBO diesel has been started.

Which of the following will allow the operator to energize emergency bus 34C from the SBO diesel?

A. The operator resets the station LOP signal at the sequencer only.

B. The operator resets the LOP signal at Main Board 2 only.

C. The operator resets the LOP signal at MB2 and resets the station LOP signal at the sequencer.

D. The operator presses the UV block bypass pushbutton at MB8R and resets the LOP signal at MB2.

Proposed Answer: D

Explanation (Optional): Once the LOP occurs, if the RSST does not energize the bus after 1.8 seconds, the RSST supply breaker and the bus tie breaker are locked out for 6 minutes. Per the stem, 15 minutes has elapsed, so the LOP lockout can be reset at MB8R and either off-site or the SBO could be placed on the bus. (A, B, and C wrong). Also, the LOP signal must be reset at MB2 or the sequencer ("D" correct).

Technical Reference(s): LSK 24-3K, 24.4A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03851 Describe the major action categories within EOP 35 ECA-0.0. (As available)

Question Source: Bank # 73167

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.7
55.43.5

Comments:

Examination Outline Cross-reference:	Question #	17
	Tier #	1
	Group #	1
	K/A #	057.GEN.2.4.11
	Importance Rating	3.6

Proposed Question:
With the plant at 100% power, VIAC 2 deenergizes, and the crew enters AOP 3564 "Loss of One Protective System Channel".

How does AOP 3564 address the bistable tripping requirements of Tech Spec LCO 3.3.2 "ESF Actuation System Instrumentation" for all of the instruments that have lost power, if required?

A. The bistables are directed to be tripped in AOP 3564 "Loss of One Protective System Channel", step 2 while checking if the major control systems are operating normally in auto.

B. The bistables are directed to be tripped via AOP 3571 "Instrument Failure Response" attachments, referenced by AOP 3564, step 11, after verifying the VIAC is still deenergized.

C. The bistables are not required to be tripped, since Tech Spec LCO 3.8.3.1, referenced by AOP 3564 "Loss of One Protective System Channel", step 6, includes all ACTIONs required for a loss of VIAC.

D. The bistables are not required to be tripped, since Tech Spec LCO 3.8.3.2, referenced by AOP 3564 "Loss of One Protective System Channel", step 6, includes all ACTIONs required for a loss of VIAC.

Proposed Answer: B
Explanation (Optional): "B" is correct, since AOP 3564, step 11 directs the crew to perform the applicable AOP 3571 attachments, which trip bistables, after verifying the VIAC is still deenergized. "A", "C", and "D" are plausible, since these are actual steps in AOP 3564 that deal with Tech Specs and control systems.

Technical Reference(s): AOP 3564, steps 2, 6, and 11. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Tech Spec sections 3/4

Learning Objective: MC-03955 Describe the major action categories contained within AOP 3564 "Loss of one protective system channel". (As available)
MC-03958 Given a plant condition requiring the use of AOP 3564... identify applicable Tech Spec action requirements.

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.10
55.43.2 and 43.5

Comments:

Examination Outline Cross-reference:	Question #	18 (SRO)
	Tier #	1
	Group #	1
	K/A #	PLANT SPECIFIC
	Importance Rating	N/A

Proposed Question:
With the plant initially at 100% power, the following sequence of events occurs:

1. All AC power is lost, and the crew enters ECA-0.0 "Loss of All AC Power".
2. CONVEX reports that it will be several hours before offsite power is restored.
3. The crew starts depressurizing all SGs to cooldown the RCS.
4. Maintenance reports that both the "A" and "B" EDGs will not be available for several hours.
5. After 25 minutes, the SBO diesel is started and used to restore power to 34Aand 34C
6. The crew transitions to ECA-0.3 "Loss of All AC Power, Recovery with the SBO Diesel".

Which of the following will the crew do in accordance with ECA-0.3?

A. Continue depressurizing all SGs to 260 psig while performing the actions of ECA-0.3.

B. Transition to ES-0.2 "Natural Circulation Cooldown" upon completion of ECA-0.3.

C. Transition to ECA-0.2 "Loss of All AC Power, Recovery with SI Required" if pressurizer level drops to less than 16%, or RCS subcooling drops less than 32°F.

D. Transition to FR-H.1 "Loss of Secondary Heat Sink", if the Turbine Driven Auxiliary Feedwater Pump trips with less than 8% narrow range in all Steam Generators.

Proposed Answer: B
Explanation (Optional): Due to significant loading limitations with the SBO diesel, the crew will monitor status trees for information only in ECA -0.3 ("D" wrong), and will not transition to ECA-0.2 when the need exists for an SIS ("C" wrong). ECA-0.3 uses the strategy of ECA-0.1 Loss of All AC Power, Recovery Without SI Required" to cooldown the RCP seals by cooling down the RCS via natural circulation ("A" wrong, "B" correct). "A" is plausible, since SG depressurization is a strategy in ECA-0.0. "C" is plausible since transitioning to ECA-0.2 is done from ECA-0.1 under these conditions. "D" is plausible since status tree monitoring is performed in ECA-0.1 when the emergency bus is restored with the proper equipment running.

Technical Reference(s): ECA-0.3, NOTE prior to step 1, ECA-0.3 steps 1, 7, 22 and 25. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03868 Discuss conditions which require transition to other procedures from ECA-0.3. (As available)

Question Source: New

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	19
	Tier #	1
	Group #	1
	K/A #	062.GEN.2.4.4
	Importance Rating	4.3

Proposed Question:
Which of the following conditions meets the entry conditions for AOP 3560 "Loss of Service Water"?

A. In MODE 1, RPCCW heat exchanger flow meter indicates higher than normal flow and RPCCW surge tank level indicates 85% and decreasing.

B. In MODE 3, Service Water discharge pressure instrument indicates no pressure and the RPCCW heat exchanger flow meter indicates no flow.

C. In MODE 4, temperature control is lost to the RHR heat exchangers and the Service Water dilution water supply isolation valves for the hypochlorite pumps fail closed.

D. In MODE 5, RHR heat exchanger outlet temperature is increasing and Service Water flow to the operating train's RPCCW heat exchanger indicates 8000 gpm.

Proposed Answer: B

Explanation (Optional):
A is wrong: This is an entry condition for AOP 3561, Loss of RPCCW. If the higher than normal Service Water flow is due to a piping break, this is dealt with using ARPs. B is correct: Listed as entry conditions for AOP 3560, Loss of Service Water C is wrong: These are indications for entry into AOP 3562, Loss of Instrument Air. D is wrong: This is a procedural direction to AOP 3560 but the criteria is less than 6200 gpm.

Technical Reference(s): AOP 3560 entry conditions (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03926 Identify conditions that require entry into AOP 3560, Loss of Service Water (As available)

Question Source: New

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.10
55.43.2

Comments:

Examination Outline Cross-reference:		
	Question #	20
	Tier #	1
	Group #	1
	K/A #	067.GEN.2.4.7
	Importance Rating	3.8

Proposed Question:
With the plant at 100% power, the following sequence of events occurs:

1. A fire breaks out in the Auxiliary Building.
2. The crew enters EOP 3509 "Fire Emergency".
3. The crew enters EOP 3509.2 "Aux Bldg. El. 24'6" South Floor Area, 43'6", & 66'6" Fire".
4. The fire progresses to the point where the crew trips the reactor and verifies the turbine is tripped.

What action will EOP 3509.2 direct the crew to take regarding the secondary plant, and why?

A. Place the steam dumps in the steam pressure mode to maintain RCS temperature at no load Tave.

B. Bypass the steam dump Lo-Lo Tave interlock in order to commence a plant cooldown.

C. Actuate Main Steam Isolation (MSI) to prevent an uncontrolled cooldown of the primary plant.

D. Close MSIVs and MSIV bypass valves to establish a known configuration on the secondary plant.

Proposed Answer: D
Explanation (Optional): "D" is correct since the potential impact of a fire on all electrical components on the secondary side downstream of the MSIVs has not been determined. "C" is plausible, since the procedure directs closing the MSIVs and Byp. Valves. "A" and "B" are plausible, since steam dumps are placed in the steam pressure mode and used to cool down the plant on reactor trips in non-fire situations.

Technical Reference(s): EOP 3509.2, step 20 (Attach if not previously provided)
3509.2 basis doc, step 20

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-06184 Discuss the basis of major EOP 3509.2 procedure steps and/or sequence of steps (As available)

Question Source: Modified Bank # 60684 (Parent attached)
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Original question 60684

The plant is operating at 100% power.

A fire breaks out in the auxiliary building. The crew enters EOP 3509 and 3509.2.

Why, after tripping the reactor and verifying turbine trip, does EOP 3509.2 then CLOSE MSIVs and MSIV bypass valves?

A. Ensure the RCS will heat up, thereby inserting negative reactivity.

B. Preclude blowing rupture discs on the LP turbines.

C. Prevent rotor bowing of the main turbine.

D. Establish a known configuration on the secondary plant.

Answer: D

Examination Outline Cross-reference:	Question #	21
	Tier #	1
	Group #	1
	K/A #	068.AK2.03
	Importance Rating	3.1

Proposed Question:
Current Conditions:

- A fire is burning in the Instrument Rack Room.
- The crew has entered EOP 3509.1 "Control Room, Cable Spreading Area or Instrument Rack Room Fire" and is preparing to evacuate the control room.
- Prior to evacuating, the RO closes both PZR PORV block valves to prevent spurious PORV operation.

What actions, if any, will be taken by the operators after evacuation to regain control of the PORV's (3RCS*PCV455A and/or 3RCS*PCV456) for RCS depressurization?

A. Control power will be removed from 3RCS*PCV456. Control of 3RCS*PCV455A will be isolated from the Control Room at the FTSP and its block valve will be reopened at the Auxiliary Shutdown Panel.

B. Control power will be removed from 3RCS*PCV455A. Control of 3RCS*PCV456 will be isolated from the Control Room at the FTSP and its block valve will be reopened at the Auxiliary Shutdown Panel.

C. Control of both 3RCS*PCV455A and 3RCS*PCV456 will be isolated from the Control Room at the FTSP and both block valves will be reopened at the Auxiliary Shutdown Panel.

D. Both block valves will be left closed, since both 3RCS*PCV455A and 3RCS*PCV456 can **NOT** be operated from the Auxiliary Shutdown Panel.

Proposed Answer: A
Explanation (Optional): PORV 455A has a switch on the FTSP, 456 does not ("D" wrong). Step 2 of att A has the operator remove control power for PORV 456 at 3BYS*PNL23F, circuit 3 ("B" and "C" wrong). Step 48 opens the "A" PORV Block Valve, and uses the "A" PORV to depressurize the plant at the Auxiliary Shutdown Panel ("A" correct).

Technical Reference(s): LSK-25-1.2B, ESK-7DW, EOP 3509.1, steps 2, 48, and Att. A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-06266 Discuss the basis of major precautions, procedure steps/or sequence of steps contained within the EOP 3509 series procedures. (As available)

Question Source: Bank # 68334

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.7

Comments:

Examination Outline Cross-reference:	Question #	22 (SRO)
	Tier #	1
	Group #	1
	K/A #	W/E14.EA2.1
	Importance Rating	3.8

Proposed Question:
The following sequence of event occurs:

1. A LOCA has occurred.
2. The crew is performing actions in E-1 "Loss Of Reactor Or Secondary Coolant".
3. The RO reports that the "Containment" status tree has turned from GREEN to ORANGE.
4. The STA informs the crew that no other RED or ORANGE paths exist.
5. Containment pressure is 24 psia and slowly increasing.
6. Containment radiation is 100 R/hr and slowly increasing.
7. Containment sump level is 15 feet and slowly increasing.

What action, if any, should be taken by the crew to address the ORANGE path?

A. No action is required, since the status tree is invalid.

B. Transition to FR-Z.1 "Response to High Containment Pressure".

C. Transition to FR-Z.2 "Response to Containment Flooding".

D. Transition to FR-Z.3 "Response to High Containment Radiation Level".

Proposed Answer: B
Explanation (Optional): CTMT orange paths are from CTMT pressure of 23 psia ("B" correct, "A" wrong), or CTMT high sump level 15.75 feet ("C" wrong). CTMT radiation is above the setpoint of 10R/hr, but is only a yellow path ("D" wrong).
Technical Reference(s): CTMT CSF Status Tree (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None
Learning Objective: MC-04666 Identify plant conditions which require entry into EOP35 FR-Z.1. (As available)
Question Source: Modified Bank # 71298 Parent attached
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.43.5
Comments:

Original question 71298

The following sequence of event occurs:

1. A LOCA has occurred.
2. The crew is performing actions in E-1 LOSS OF REACTOR OR SECONDARY COOLANT.
3. The RO reports that the "Containment" status tree has turned from GREEN to ORANGE.
4. The STA informs the crew that no other RED or ORANGE paths exist.
5. Containment pressure is 19 psia and slowly increasing.
6. Containment radiation is 100 R/hr and slowly increasing.
7. Containment sump level is 16 feet and slowly increasing.

What action, if any, should be taken by the crew to address the ORANGE path?

A. No action is required, since the crew has verified that the status tree is invalid.

B. Transition to FR-Z.1 "Response to High Containment Pressure".

C. Transition to FR-Z.2 "Response to Containment Flooding".

Transition to FR-Z.3 "Response to High Containment Radiation Level".

Answer: C

Examination Outline Cross-reference:	Question #	23
	Tier #	1
	Group #	1
	K/A #	W/E06.EK1.2
	Importance Rating	4.1

Proposed Question:
The crew has entered EOP 35 FR-C.2 "Response to Degraded Core Cooling" due to an ORANGE path on the "Core Cooling" status tree.

While the crew is performing the depressurization of all intact steam generators to 140 psig, the INTEGRITY critical safety function status turns RED.

What actions will be taken by the crew in response to these conditions?

A. Complete the current step in FR-C.2, then address FR-P.1.

B. Immediately transition to FR-P.1, and when completed, return to FR-C.2.

C. Perform appropriate actions of FR-P.1 concurrently with FR-C.2.

D. Complete FR-C.2 in its entirety and then address FR-P.1.

Proposed Answer: D
Explanation (Optional):Caution prior to step 10 tells operators to remain in C.2, it is expected that during the depressurization, accumulators will inject and the integrity tree may turn RED. To preclude core cooling problems that may be aggravated due to FR-P.1 actions later, C.2 should be completed prior to addressing P.1.
Technical Reference(s): FR-C.2, CAUTION prior to step 11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None
Learning Objective: MC-04531 Discuss conditions which require transition to other procedures from EOP 35 FR-C.2 (As available)
Question Source: Bank # 65051
Question History: Millstone 2000 NRC Exam
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.10
55.43.5
Comments:

Examination Outline Cross-reference:		
	Question #	24 (SRO)
	Tier #	1
	Group #	1
	K/A #	076.AK1.06
	Importance Rating	2.6

Proposed Question:
The plant has just shutdown for a refueling outage when the following sequence of events occurs:

1. Prior to commencing the cooldown, the crew performs an early boration to the COLD SHUTDOWN boron concentration.
2. RCS activity increases higher than was expected.
3. The crew enters AOP 3553 "High RCS Activity".
4. The RO verifies letdown flow is 75 gpm.
5. The Primary Rounds PEO verifies that the letdown demineralizer is in service.
6. The Primary Rounds PEO verifies that proper DP exists on both the Letdown and Reactor Coolant filters.
7. Chemistry reports that the Purification Demineralizer decontamination factor is acceptable.

What operational implications exist based on the above conditions?

A. Access to the Auxiliary Building may have to be immediately restricted, and the crew will consult with Reactor Engineering about increasing letdown flow.

B. Access to the ESF Building may have to be immediately restricted, and the crew will consult with Reactor Engineering about increasing letdown flow.

C. Access to the Auxiliary Building may have to be immediately restricted, and the crew will place the standby purification demineralizer (mixed bed) in service.

D. Access to the ESF Building may have to be immediately restricted, and the crew will place the standby purification demineralizer (mixed bed) in service.

Proposed Answer: A
Explanation (Optional): The early boration results in increase in radiation levels in the Auxiliary Bldg and Containment ("B" and "D" wrong). "B" and "D" are plausible, since the ESF Bldg radiation levels will be an issue after RHR is placed in service. AOP 3553 step 7 directs the operators to consult with RE about increasing letdown flow ("A" correct). The standby purification demin will only be placed in service if improper letdown flow exists, or if purification demineralizer DF is >25 ("C" and "D" wrong).

Technical Reference(s): AOP 3553 (Attach if not previously provided)
OP 3208, step 4.1.3 ALARA Note

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05893 Discuss the basis of major procedure steps or sequence of steps in AOP 3553. (As available)

Question Source: New

Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.8, 41.10 55.43.5

Comments:

Examination Outline Cross-reference:	Question #	25
	Tier #	1
	Group #	2
	K/A #	007.EK3.01
	Importance Rating	4.6

Proposed Question:
The plant trips due to a loss of offsite power. The crew is currently in ES-0.1, "Reactor Trip Response."

Why will the crew start the SBO diesel?

A. To power Station Blackout Diesel auxiliaries.

B. To power selected "A" Train non-emergency loads , such as the plant process computer.

C. To power various non-emergency loads from either train, such as a Fuel Pool Purification Pump.

D. To power PGS Pumps from either train, allowing for RCS makeup.

Proposed Answer: A

Explanation (Optional):
SBO diesel installed to cope with loss of all AC power event, postulated to last eight (8) hours.
With the loss of offsite power, loss of the EDGs results in a station black out. If the SBO diesel battery is depleted, the SBO diesel cannot perform the intended function to supply a source of AC power for an eight (8) hour period.
"B", "C", and "D" are plausible, since non-emergency busses have been lost, and the SBO diesel will be loaded later on in ES-0.2, since running the SBO diesel unloaded for an extended period of time allows buildup of combustibles in the SBO diesel exhaust.

Technical Reference(s): ES-0.1 step 8 deviation document (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05512 DISCUSS the basis of major procedure steps &/or sequence of steps in EOP 35 ES-0.1. (As available)

Question Source: Bank # 60749
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.8, 41.10

Comments:

Examination Outline Cross-reference:	Question #	26
	Tier #	1
	Group #	2
	K/A #	008.AK1.01
Proposed Question:	Importance Rating	3.7

Current conditions:

- The crew is recovering from a faulted SG outside CTMT, upstream of the MSIVs.
- SI has been terminated.
- The crew is maintaining the plant in a stable condition per ES-1.1 "SI Termination".
- PZR pressure is 2300 psia and stable.
- PZR level is 60% and stable.
- PRT pressure is 30 psia.

RCS pressure starts to decrease rapidly due to a significant leak on one of the PZR safety valves.

Based on the event in progress, which parameter will require the manual reinitiation of Safety Injection, and what will the PZR Safety valve tailpipe temperature be indicating?

A. Low PZR level; 655°F tailpipe temperature.

B. Low RCS subcooling; 655°F tailpipe temperature.

C. Low PZR level; 250°F tailpipe temperature.

D. Low RCS subcooling; 250°F tailpipe temperature.

Proposed Answer: D

Explanation (Optional): On a vapor space break, PZR level is not a valid indication of RCS inventory, since pressure will quickly drop to saturation in the vessel and the hot legs ("D" correct), and formation of a two phase mixture will force flow up the surge line and into the pressurizer. This will cause pressurizer level to increase until the PZR is full ("A" and "C" wrong). The enthalpy of the saturated fluid in the vapor space does not change as it passes through a safety valve, resulting in a temperature indication corresponding to the pressure in the PRT ("A" and "B" wrong). "A" and "C" are plausible, since for most small break LOCAs, the PZR will decrease. "A" and "B" are plausible, since 655°F is saturation temperature for PZR pressure.

Technical Reference(s): Westinghouse MITCORE text pg 16-45 and 46 (Attach if not previously provided)
E-1 series foldout page.
Steam Tables

Proposed references to be provided to applicants during examination: Steam tables

Learning Objective: MC-04914 OUTLINE the unique characteristics of a Pressurizer Vapor Space LOCA. (As available)

Question Source: New

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.8, 41.10

Comments:

Examination Outline Cross-reference:	Question #	27 (SRO)
	Tier #	1
	Group #	2
	K/A #	009.EK1.02
	Importance Rating	4.2

Proposed Question:
A small break LOCA has occurred, with current conditions as follows:

- The crew is performing the actions of ES-1.2 "Post LOCA Cooldown And Depressurization".
- ECCS pumps have been stopped, and normal charging is aligned.
- The crew has just completed depressurizing the RCS to minimize subcooling.
- PZR pressure is 400 psia and decreasing slowly.
- Core Exit Thermocouples read 416°F and decreasing slowly.
- RCS hot leg temperatures are 410°F and decreasing slowly.
- Pressurizer Level is 20% and decreasing slowly.
- CTMT temperature is 135° and increasing slowly.

Based on these indications, what actions does ES-1.2 direct the crew to take next?

A. Isolate the low pressure SI accumulators.

B. Operate ECCS pumps as necessary and stop both EDGs.

C. Reinitiate SI and use normal spray to refill the PZR.

D. Energize all PZR heaters to restore subcooling.

Proposed Answer: B

Explanation (Optional):
Since subcooling is < 32°F, ES-1.2 step 21 directs the crew to operate ECCS pumps as necessary. The crew will skip the accumulator isolation in step 22 since subcooling is not adequate, and stop both EDGs, which are running unloaded due to the SIS signal ("A" wrong, "B" correct). "A" is plausible, since this is the action the crew would take if subcooling and PZR level were adequate. "C" is wrong since reinitiation of SI will result in a higher pressure than necessary, and will realign systems to the SI configuration. "C" is plausible, since SI would restore subcooling and PZR level, and spray would be used per step 11 if PZR level were too low. "D" is wrong , since heaters are not used to repressurize the RCS on loss of subcooling. "D" is plausible since step 19 uses heaters to restore saturation conditions in the PZR. while pressurizer heaters are energized to establish a bubble in the pressurizer, they are

Technical Reference(s): ES-1.2 steps 11, 19-23 (Attach if not previously provided)
Steam tables

Proposed references to be provided to applicants during examination: Steam tables

Learning Objective: MC-05530 Discuss the basis of major procedure steps and/or sequence of steps in EOP 35 ES-1.2. (As available)

Question Source: Modified Bank # 72380 Parent attached

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.8, 41.10
55.43.5

Comments:

Original Question 72380

A small break LOCA has occurred. The crew is performing the actions of ES1.2, POST LOCA COOLDOWN AND DEPRESSURIZATION.

ECCS pumps have been stopped. Normal Charging is aligned. The crew is depressurizing the RCS. When the depressurization is stopped, the following conditions exist:

- RCS Subcooling is 28°F and DECREASING
- Pressurizer Level is 20% and DECREASING

Based on these indications, what actions should be taken?

A. ISOLATE Letdown. Check to ensure Pressurizer Level stabilizes above 16%.

B. Manually start ECCS pumps as necessary to regain subcooling.

C. REINITIATE Safety Injection and verify all safeguards equipment has actuated.

D. INCREASE RCS pressure using pressurizer heaters to regain subcooling.

Answer: B

Examination Outline Cross-reference:		
	Question #	28
	Tier #	1
	Group #	2
	K/A #	W/E03.EK1.1
	Importance Rating	4.0

Proposed Question:

PLANT CONDITIONS:

- A LOCA occurred, and the crew is in ES-1.2, "Post-LOCA Cooldown and Depressurization."
- One charging pump has been stopped
- All other high head ECCS pumps are running
- No RCPs are running
- Pressurizer level is 30%

Sufficient subcooling exists and the operator stops the "A" Safety Injection pump. Immediately after stopping the pump, RCS pressure begins to **decrease**.

What action should the crew take immediately in response to the decreasing RCS pressure?

A. Manually reinitiate Safety Injection.

B. Restart the "A" Safety Injection pump to restore RCS pressure to its previous value.

C. Restart the "A" CHS pump to restore RCS pressure to its previous value.

D. Monitor RCS subcooling and PZR level to ensure they stabilize above SI reinitiation values.

Proposed Answer: D

Explanation (Optional): "D" is correct, since after stopping any SI pump, RCS pressure should be allowed to stabilize or increase before stopping another SI pump.

The basis for this is that after the SI pump is stopped, RCS pressure may decrease rapidly to a new equilibrium value where the reduced SI flow again matches leakage from the RCS. The criteria for stopping the next SI pump has been calculated assuming steady state conditions. Hence, to ensure that these criteria are appropriate, RCS pressure and subcooling should be allowed to stabilize or increase before stopping additional SI pumps.

Technical Reference(s): EOP 35 ES-1.2 Foldout Page, ERG ES-1.2 basis doc, step 13 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05530 Discuss the basis of major procedure steps and/or sequence of steps in EOP 35 ES-1.2. (As available)

Question Source: Bank # 63960

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.5, 41.7

Comments:

Examination Outline Cross-reference:	Question #	29
	Tier #	1
	Group #	2
	K/A #	W/E11.EA1.3
Proposed Question:	Importance Rating	4.2

A LOCA is in progress, with current conditions as follows:

- The crew was unable to establish cold leg recirculation, and has transitioned to ECA-1.1 "Loss of Emergency Coolant Recirculation".
- RCS pressure is 1000 psia.
- The crew has just verified that ECCS is in service.

What is an optimal ECCS lineup the crew will establish for core heat removal?

A. Both trains of CHS pumps and both trains of SIH pumps running.

B. The "A" train CHS pump and the "A" train SIH pump running only.

C. The "A" train CHS pump and the "B" train SIH pump running only.

D. Both trains of CHS pumps running only.

Proposed Answer: C

Explanation (Optional): The desired ECCS lineup provides adequate heat removal AND minimizes SI and spray flow to delay the depletion of the RWST ("A" wrong). The crew will also cooldown to RHR conditions. "B" is wrong and "C" is correct, since the NOTE prior to step 12 directs the use of alternate trains when possible, which is desired since some injection will be maintained on the loss of an electrical train. "D" is wrong since it is desired to operate one train of ECCS pumps (1 CHS and 1 SIH pump).

Technical Reference(s): ECA-1.1, Step 12 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03871 Describe the major action categories within EOP 35 ECA-1.1 (As available)

Question Source: Bank # 75602

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.7 and 41.10

Comments:

Examination Outline Cross-reference:	Question #	30 (SRO)
	Tier #	1
	Group #	2
	K/A #	025.GEN.2.4.24
	Importance Rating	3.7

Proposed Question:
INITIAL CONDITIONS:

- Plant is in MODE 5, solid plant operations, on the "A" Train of RHR
- "B" Electrical Distribution Train outage is in progress, and cannot be immediately restored
- RCS temperature is 150°F
- RCS pressure is 150 psia
- All RCS loops are full
- All Steam Generators are in Wet-Layup
- The "A" Charging Pump is running
- No RCPs are running

The "A" RPCCW Pump fails due to a motor bearing failure.

What action will the crew take to remove decay heat?

A. Open both PORVs, fill the RCS using one Charging Pump from the RWST.

B. Open both PORVs, fill the RCS using one SI Pump from the RWST.

C. Throttle open the charging line flow control valve to raise RCS pressure to >170 psia, and open the steam generator atmospheric dump valves.

D. Start one Reactor Coolant Pump, check proper differential pressure across its #1 seal, and open the steam generator atmospheric dump valves.

Proposed Answer: C
Explanation (Optional): "C" is correct, since the RCS is already full and steam generators are available. The procedure has conditions established for natural circulation, RCS pressure is increased to ensure subcooled natural circulation cooling, and the steam generators are used to dump steam. "A" and "B" are wrong, since bleed and feed is only used if natural circulation cooling is unsuccessful. The charging pump is the preferred feed source, and the SI Pump is the backup source of feed. "D" is wrong, since forced cooling is only used if a RCP is already running.
Technical Reference(s): EOP 3505 Attachment B, Steps 9-14 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None
Learning Objective: MC-04351 Describe major action categories within EOP 3505 (As available)
Question Source: Modified Bank # 64291 Parent attached
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:
Original question 64291

INITIAL CONDITIONS:

- Plant is in MODE 5 on the "A" Train of RHR
- "B" Electrical Distribution Train is deenergized for maintenance, and cannot be immediately restored
- All RCS loops are full
- All Steam Generators are in Wet-Layup
- No RCPs are running

The "A" RHR Pump fails due to a motor bearing failure.

What action will the crew take to remove decay heat?

A. Open both PORVs, fill the RCS using one Charging Pump from the RWST.

B. Open both PORVs, fill the RCS using one SI Pump from the RWST.

C. Establish conditions for natural circulation and open the steam generator atmospheric dump valves.

D. Open 1 PORV, fill RCS using one charging pump from the RWST.

Answer: C

Examination Outline Cross-reference:		
	Question #	31
	Tier #	1
	Group #	2
	K/A #	032.AK1.01
	Importance Rating	3.1

Proposed Question:
Initial conditions:

- A reactor startup is in progress
- Control banks are being withdrawn
- Source Range counts: N31 = 1500 cps
  N32 = 1600 cps

A faulty power supply causes significant instrument power voltage fluctuations to Source Range channel N31.

Which of the following describes the effect of the power supply voltage fluctuations on the plant?

A. Instrument voltage changes will result in proportional changes in indicated count rate. The reactor may trip on high source range flux.

B. Instrument voltage changes will result in proportional changes in indicated count rate. The reactor will not trip since the source range high flux trip is already blocked.

C. Instrument voltage changes will not result in changes in indicated count rate, since the detector operates in the ion chamber region. The crew will continue the startup.

D. Instrument voltage changes will not result in changes in indicated count rate, since the detector operates in the ion chamber region. The crew will stop the startup and drive rods in.

Proposed Answer: A
Explanation (Optional): "C" and "D" are wrong since the source ranges operate in the proportional region of the gas amplification curve. The Source Range high flux trip will actuate when counts exceed 10^5 cps on 1/2 channels. Since the coincidence is 1/2, the reactor will trip. "A" is correct, and "B" is wrong, since source ranges are blocked above P-6, which comes in at 10^{-10} amps in the intermediate range, which is above 10^4 cps. "B" is plausible since source ranges will be blocked during the startup. "C" and "D" are plausible since the intermediate range detectors operate in the ion chamber region.

Technical Reference(s):	OP 3360, Precautions 3.3 and 3.4	(Attach if not previously provided)
	OP 3202, step 4.28	
	NIS015C, pg 13 and 14	

Proposed references to be provided to applicants during examination: None

Learning Objective:	MC-05229 For the following conditions, determine the effects on the NIS system and on interrelated systems: Source range instrument failure below P-6...	(As available)

Question Source: Bank # 75606
Question History: Previous NRC Exam

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.6, 41.7, 41.8

Comments:

Examination Outline Cross-reference:		
	Question #	32
	Tier #	1
	Group #	2
	K/A #	033.AA2.11
	Importance Rating	3.4

Proposed Question:
Twenty minutes after a reactor trip, the RO reports the following indications:

Intermediate Range channel N-35 reads 5 x 10^{-7} amps, with 0 DPM startup rate.
Intermediate Range channel N-36 reads 1 x 10^{-11} amps, with 0 DPM startup rate.

What is the cause of the above condition, and what action will be taken?

A. N-35 has lost compensating voltage. The crew will actuate both source range switches on MB4, since actual reactor power indication has been lost on MB4.

B. N-35 is overcompensated. The crew will actuate both source range switches on MB4, since actual reactor power indication has been lost on MB4.

C. N-36 has lost compensating voltage. The crew will wait for the Source Ranges to automatically energize to prevent reenergizing the source ranges prematurely.

D. N-36 is overcompensated. The crew will wait for the Source Ranges to automatically energize to prevent reenergizing the source ranges prematurely.

Proposed Answer: A

Explanation (Optional):
With an IR is undercompensated, gamma current will be seen by the instrument, and indicated flux level for that channel will plateau at a point above P-6. N-35 exhibits this, and N-36 is at the bottom of its indicating range ("A" correct, "B" wrong). N-36 reads low, which could be an indication of overcompensation ("C" wrong), but it has been >12 minutes since the trip, and power should be low. This is backed up by the fact that N-35 does not have the characteristic -1/3 DPM post trip SUR, which would be the case if N-36 was overcompensated.

Technical Reference(s): Functional Dwg # 3 & 4 (Attach if not previously provided)
AOP 3571, Att. E

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05229 For the following conditions, determine the effects on the NIS system and on interrelated systems:... Under-compensated intermediate range detector during reactor shut down operations... (As available)

Question Source: Bank # 75472

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.6
55.43.5

Comments:

Examination Outline Cross-reference:	Question #	33
	Tier #	1
	Group #	2
	K/A #	PLANT SPECIFIC
	Importance Rating	N/A

Proposed Question:
Initial conditions:

- A hurricane warning is in effect for southeastern Connecticut.
- 100 mph winds expected in the next 6 hours.
- The crew has entered AOP 3569 "Severe Weather Conditions".
- A plant shutdown is being conducted.

What is the expected final condition of the plant when the actions specified in AOP 3569 are completed?

A. RCS pressure at 2250 psia, with accumulator isolation valves open and PZR level at 28%.

B. RCS pressure at 2250 psia, with accumulator isolation valves closed and PZR level at 60%.

C. RCS pressure at 710 psia, with accumulator isolation valves open and PZR level at 60%.

D. RCS pressure at 710 psia, with accumulator isolation valves closed and PZR level at 28%.

Proposed Answer: C
Explanation (Optional): With winds in excess of 90 mph, a loss of all AC power is a plausible event, and the crew is directed to cooldown the plant to less than 400°F to minimize potential for damage to the RCP seals; lower RCS pressure to above 700 psia ("A" and "B" wrong) to minimize RCS inventory loss through the RCP seals, with the accumulators available to inject ("B" and "D" wrong); and PZR level at 60% ("A" and "D" wrong) to maintain extra inventory available in the pressurizer ("C" correct).

Technical Reference(s):	AOP 3569, step 11	(Attach if not previously provided)
	AOP 3569, Attachment A	
\	OP 3208, Attachment 1	\

Proposed references to be provided to applicants during examination: None

Learning Objective:	MC-03971 Describe the major action categories contained within AOP 3569, Severe Weather Conditions.	(As available)

Question Source:	Bank # 64019
Question Cognitive Level:	Memory or Fundamental Knowledge
10 CFR Part 55 Content:	55.41.10
	55.43.5

Comments:

Examination Outline Cross-reference:	Question #	34 (SRO)
	Tier #	1
	Group #	2
	K/A #	038.EK1.02
	Importance Rating	3.5

Proposed Question:

Current Plant Conditions:

- A SGTR has occurred
- After cooldown and depressurization, ECCS flow was terminated
- Normal charging and letdown have been established
- Pressurizer level is 61% and slowly increasing
- Ruptured SG level is 65% and increasing

Using E-3, step 27 "Control RCS Pressure And Charging Flow To Minimize RCS-to-Secondary Leakage" **attached to the back of this exam,** what are all of the required actions to be taken?

A. Increase charging flow AND maintain RCS and ruptured SG pressures equal.

B. Turn on the pressurizer heaters.

C. Maintain RCS and ruptured SG pressures equal.

D. Depressurize the RCS AND decrease charging flow.

Proposed Answer: D

Explanation (Optional):
Step 27 table. Ruptured SG level is increasing with pressurizer level between 50% and 73%. This indicative of RCS to secondary leakage occurring, with excess inventory in the RCS. Required action is to depressurize the RCS, stopping primary to secondary leakage ("B" and "C" wrong) and decrease charging flow ("A" wrong, "D" correct). "A", "B", and "C" are plausible since they all are actions that may be taken at step 27, depending on conditions.

Technical Reference(s): E-3, Step 27 (Attach if not previously provided)
WOG E-3 Bkgd doc, step 30

Proposed references to be provided to applicants during examination: E-3, step 27

Learning Objective: MC-04371 Describe the major action categories within EOP 35 E-3. (As available)

Question Source: Bank # 60617
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.8, 41.10
Comments:

Examination Outline Cross-reference:		
	Question #	35
	Tier #	1
	Group #	2
	K/A #	054.AK3.03
	Importance Rating	4.1

Proposed Question:

A complete loss of main feedwater has occurred, resulting in a reactor trip. Conditions five minutes after the trip are as follows:

- All equipment operated as designed.
- No operator actions have been taken, other than E-0 immediate actions.
- The crew has just entered EOP 35 ES-0.1 "Reactor Trip Response".
- PZR level is 25% and slowly decreasing.
- SG narrow range levels are off-scale low.
- Steam Generator pressures are approximately 990 psig and slowly decreasing.
- Tave is 545°F and slowly decreasing.
- RCS pressure is 2020 psia and slowly decreasing.

What action does ES-0.1 direct the crew to take, and why?

A. Throttle AFW flow to between 530 and 600 gpm to stop the cooldown.

B. Throttle AFW flow to between 530 and 600 gpm to prevent water hammer in the feed ring.

C. Maintain full AFW flow to limit peak RCS pressure on a loss of feed event.

D. Maintain full AFW flow to cover the SG U-Tubes.

Proposed Answer: A

Explanation (Optional): The balance of plant operator may, at any time when not required to be performing an immediate action or sequenced steps, throttle AFW flow if minimum heat sink requirements are satisfied. This includes throttling flow to minimize RCS cooldown. ES-0.1 step 1 has the crew throttle AFW if a cooldown is in progress. "A" is wrong since AFW has already initiated at full flow on the trip. "C" is plausible, since full AFW flow is assumed for a loss of feed ATWS to limit peak RCS pressure. "D" is plausible, since keeping the tubes wetted is a concern if heat sink has been lost, and flow is being restored.

Technical Reference(s): ES-0.1 step 1 (Attach if not previously provided)
OP3272 Attachment 3

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05512 DISCUSS the basis of major procedure steps &/or sequence of steps in EOP 35 ES-0.1. (As available)

Question Source: Bank # 70200

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.5, 41.10

Comments:

Examination Outline Cross-reference:		
	Question #	36
	Tier #	1
	Group #	2
	K/A #	W/E05.EK3.1
	Importance Rating	3.8

Proposed Question:
A loss of heat sink has occurred. Bleed and feed of the RCS has been initiated using one PORV.

What will be the effect, if any, of using only one PORV, and why?

A. Bleed and feed effectiveness will be decreased, since less RCS depressurization allows less subcooled SI flow.

B. Bleed and feed effectiveness will be increased, since less RCS mass will be lost.

C. Bleed and feed effectiveness will NOT be affected, since the RCS pressure rises to the PORV setpoint in either case.

D. Bleed and feed effectiveness will NOT be affected, since the RCS depressurizes to saturation in either case.

Proposed Answer: A

Explanation (Optional):
"A" is correct, since less heat is removed via one PORV, and the RCS may not depressurize sufficiently to permit adequate cooling from SI feed flow. If core decay heat exceeds RCS bleed and feed heat removal capability, the RCS will repressurize rapidly, resulting in a rapid decrease of RCS inventory.

Technical Reference(s): FR-H.1 WOG Bkgd Doc, step 16 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04941 Appraise each operator-initiated recovery technique in its ability to restore the Heat Sink Critical Safety Function. (As available)

Question Source: Bank # 70058
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.5, 41.10
Comments:

Examination Outline Cross-reference:	Question #	37
	Tier #	1
	Group #	2
	K/A #	058.AK3.02
	Importance Rating	4.2

Proposed Question:
With the plant at 100% power, Battery Bus 1 (301A-1) deenergizes, and the crew enters AOP 3563 "Loss of DC Bus Power".

Why does AOP 3563 direct the crew to trip the reactor and enter E-0 "Reactor Trip or Safety Injection"?

A. SG levels all shrink out of the narrow range, since all 4 MSIVs close.

B. Condenser vacuum will be lost, since the SJAE steam supplies isolate.

C. The reactor will trip, since power is lost to 2 of the 3 ETS pressure switches, resulting in SSPS generating a low ETS pressure reactor trip.

D. A feedwater transient is in progress, since the MSR Drain Tank and Feed Heater emergency level control valves have failed open.

Proposed Answer: A

Explanation (Optional):
"A" is correct, since these components are powered from Batteries 1 and 2. "B" is wrong since these valves are powered from Battery 5. "C" is wrong, since 2 of the 3 ETS pressure switches are powered from Battery 5. "D" is wrong, since battery 6 powers these valves.

Technical Reference(s): AOP 3563, step 1; AOP 3563, Att A, pg 5, Att B, pg 5, Att E, pg 4, 6 and 7, Att F, pg 2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03947 Discuss the basis of major precautions, procedure steps or sequence of steps. (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.5, 41.10
Comments:

Examination Outline Cross-reference:		
	Question #	38
	Tier #	1
	Group #	2
	K/A #	061.GEN.2.4.48
	Importance Rating	3.8

Proposed Question:
With the plant at 100% power, area radiation monitor RMS16-1 (VCT and Boric Acid Tank area) goes into alarm. The RO reviews the rough log and notes the following evolutions have recently been conducted:

- A Liquid Waste Discharge was commenced.
- The Degassifier was shutdown.
- The Boron Evaporator was started up.
- A Solid Waste System resin transfer was commenced.

Which of the above activities was the likely cause of the alarm?

A. The Liquid Waste discharge.

B. The shutdown of the Degassifier.

C. The startup of the Boron Evaporator.

D. The resin transfer.

Proposed Answer: B

Explanation (Optional):
The degassifier degasses the letdown stream prior to entry into the VCT. With the degassifier shutdown, a RMS16-1 alarm can be anticipated as radioactive gasses accumulate in the VCT ("B" correct). "A", "C", and "D" are plausible, since they involve movement of radioactive material through the auxiliary building.

Technical Reference(s): AOP 3573, Att. B, pg 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05469 Describe the major administrative or procedural precautions and limitations placed on the operation of the Radiation Monitoring System, and the basis for each. (As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.11 55.43.4 and 43.5

Comments:

Examination Outline Cross-reference:	Question #	39
	Tier #	1
	Group #	2
	K/A #	W/E16.EA2.2
	Importance Rating	3.3

Proposed Question:

The reactor has tripped, and the crew is progressing through the EOP network. The crew enters EOP 35 FR-Z.3 "Response To High Containment Radiation Level".

Per FR-Z.3 guidance, which two actions are specified for ADTS consideration for use in lowering CTMT radiation levels?

A. Use of CTMT Air Filtration System and CTMT Spray Pumps.

B. Use of CTMT Vacuum System and CTMT Purge System.

C. Use of CTMT Air Filtration System and CTMT Vacuum System.

D. Use of CTMT Purge System and CTMT Spray Pumps.

Proposed Answer: A

Explanation (Optional): FR-Z.3 consists of one step plus a transition step. The one step samples CTMT atmosphere, considers the use of CTMT Air Filtration, and considers use of CTMT Spray System ("A" correct). CTMT Purge System is plausible, since it would remove activity from CTMT, and CTMT Vacuum System is plausible, since it is used as a backup to the Hydrogen Recombiner System to remove excess Hydrogen from CTMT during an accident.

Technical Reference(s): FR-Z.3, step 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: Describe the major action categories within EOP 35 FR-Z.3 (As available)

Question Source:	Bank #	74362
Question Cognitive Level:	Memory or Fundamental Knowledge	
10 CFR Part 55 Content:	55.41.10	
	55.43.5	

Comments:

Examination Outline Cross-reference:		
	Question #	40
	Tier #	1
	Group #	2
	K/A #	065.AA2.05
	Importance Rating	4.1

Proposed Question:
With the plant at 100% power, a leak in the instrument air system occurs, and the following sequence of events occurs:

1400 The RO reports that instrument air pressure is decreasing at a moderate rate.
1401 The crew enters AOP 3562 "Loss of Instrument Air"
1412 Letdown isolates
1414 PZR spray valves close
1415 Feed Reg Valves close
1417 Reactor Plant Chilled Water CTMT header isolates

At what time did AOP 3562 require the crew to shutdown the reactor via manual reactor trip?

A. 1412

B. 1414

C. 1415

D. 1417

Proposed Answer: C
Explanation (Optional): The crew is directed to trip the reactor and go to E-0 when instrument air pressure is decreasing rapidly or when feedwater control is lost ("C" correct). "A", "B", and "D" are plausible since they are actions that will occur on a loss of air that have adverse effects on the plant.
Technical Reference(s): AOP 3562, step 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03941 Discuss conditions which require transition to other procedures. (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	41
	Tier #	1
	Group #	3
	K/A #	028.AA1.08
	Importance Rating	3.6

Proposed Question:
With reactor power at 100% and the pressurizer level control selector switch in the CHAN I-II position, 3RCS-LT460 fails low. The following indications and annunciators are received:

- PRESSURIZER LEVEL DEVIATION
- PZR LVL LO HTR OFF AND LTDOWN SECURE
- The PZR Level recorder on MB4 drops to 0%.

The operators respond promptly per AOP 3571 "Instrument Failure Response", and take manual control of 3CHS*FCV121. Both functional PZR level indicators increase to 71%.

What will occur when the operators select "CHAN I-III" on the pressurizer level control switch (3RCS-LS459D)?

A. The PZR LVL LO HTR OFF AND LTDOWN SECURE annunciator will clear, and the PZR Level recorder on MB4 will return to proper indication.

B. The PZR LVL LO HTR OFF AND LTDOWN SECURE annunciator will clear, and all backup heaters in "AUTO" will automatically energize.

C. The PRESSURIZER LEVEL DEVIATION annunciator will clear, and the PZR Level recorder on MB4 will return to proper indication.

D. The PRESSURIZER LEVEL DEVIATION annunciator will clear, and all backup heaters in "AUTO" will automatically energize.

Proposed Answer: B

Explanation (Optional):
The failed backup channel initially brought in the level deviation annunciator, and isolated letdown, since both the controlling and backup channels provide letdown isolate and heater trip protection. Actual level increased due to the letdown isolation. When actual level increased to 5% above program level of 61.5%, an actual level deviation occurred ("C" and "D" wrong), calling for heaters to energize. When the operators select CHAN I-III, the low level input to the PZR LVL LO HTR OFF AND LTDOWN SECURE annunciator will be removed, clearing the annunciator. Since actual level is high, the heaters will energize ("B" correct). The PZR level recorder will not return to proper operation until its separate recorder select switch is taken to an unaffected channel ("A" and "C" wrong).

Technical Reference(s): Functional Dwg # 11 (Attach if not previously provided)
Process Dwg #11
OP 3353.MB4A, 4-1 and 5-1

Proposed references to be provided to applicants during examination: None

Learning Objective:	MC-05341 Describe the operation of the Pressurizer Pressure and Level Control System under Normal, Abnormal, and Emergency Operating conditions.	(As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.7
Comments:	

Examination Outline Cross-reference:	Question #	42
	Tier #	1
	Group #	3
	K/A #	W/E13.EK1.3
	Importance Rating	3.2

Proposed Question:
The reactor has tripped and the crew performing actions per ES-0.1 "Reactor Trip Response" when the following sequence of events occurs:

1. The crew enters EOP 35 FR-H.2 "Response To Steam Generator Overpressure" due to a yellow path on the "heat sink" status tree.
2. The crew is preparing to dump steam from the affected "A" SG.
3. The BOP reports "A" SG narrow range level is 89% and increasing slowly.

Should the crew dump steam from the "A" SG, and why?

A. No, since releasing steam may cause an uncontrolled radiation release, as the SG is likely ruptured.

B. No, since releasing steam may result in two phase flow and water hammer, potentially damaging pipes and valves

C. Yes, since releasing steam is necessary to lower SG pressure.

D. Yes, since releasing steam is necessary to lower SG level.

Proposed Answer: B
Explanation (Optional): "B" is correct, and "C" and "D" are wrong, since 87% narrow range level is at the upper SG level tap, and may be indicative of a full SG, where releasing steam may also release water, resulting in water hammer. "A" is wrong since if a tube rupture is suspected , the crew will be in E-3. "A" is plausible, since a SGTR will raise SG level. "C" and "D" are plausible, since releasing steam is the normal way to respond to an overpressure event in FR-H.2, and removing inventory will reduce both pressure and mass.
Technical Reference(s): FR-H.2 WOG Bkgd doc, Caution prior to step 4. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None
Learning Objective: MC-05976 Discuss the basis of major procedure steps and/or sequence of steps in EOP FR-H.2 (As available)

Question Source: Bank # 74634
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.8, 41.10
Comments:

Examination Outline Cross-reference:		
	Question #	43
	Tier #	1
	Group #	3
	K/A #	W/E15.EK1.1
	Importance Rating	3.0

Proposed Question:
The crew has entered EOP 35 FR-Z.2 "Response To Ctmt Flooding" and is trying to identify and isolate sources of water to the CTMT sump per FR-Z.2 step 1.

What water sources will the crew check per FR-Z.2 step 1, and why?

A. Sources such as RPCCW and Auxiliary Feed Water, since water level is above that expected from emergency stored water sources, and may damage critical plant components.

B. Sources such as RPCCW and Auxiliary Feed Water, since water level is above that expected from emergency stored water sources, and may lower TSP concentration below acceptable limits.

C. Emergency water sources such as the RWST and Service Water, since water level has reached the point where it may damage critical plant components.

D. Emergency water sources such as the RWST and Service Water, since water level has reached the point where it may lower TSP concentration below acceptable limits.

Proposed Answer: A
Explanation (Optional): "A" is correct, and "C" and "D" wrong since level above the design basis flood level in CTMT is indicative of an unexpected water source. "B" is wrong since the concern with high level is the potential damage of critical plant components.

Technical Reference(s): FR-Z.2 WOG Bkgd Doc, Step 1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05993 DISCUSS the basis of major procedure steps and/or sequence of steps in EOP 35 FR-Z.2. (As available)

Question Source: Bank # 71936
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.8 and 41.10
Comments:

Examination Outline Cross-reference:		
	Question #	44
	Tier #	2
	Group #	1
	K/A #	001.K5.97
	Importance Rating	3.6

Proposed Question:

PLANT CONDITIONS:

- Rods are in "AUTOMATIC"
- RCS Tave is 587°F
- Tref is 583°F

How fast should the control rods be moving?

A. 32 spm

B. 36 spm

C. 40 spm

D. 48 spm

Proposed Answer: C

Explanation (Optional):
Rods move at a minimum of 8 and a maximum of 72 spm. An error of 2°F will cause the minimum (8 spm) motion. Speed ramps up linearly from 3 to 5°F error. At 4°F, rod speed will be half way, or 40 spm ("C" correct). All distractors are plausible since they are within the band of minimum and maximum speeds.

Technical Reference(s): Functional sheet 9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05475 Describe the function and location of the following Rod Control System components... Reactor Control Unit... Temperature Error Summer ...Speed Controller... (As available)

Question Source: Bank # 68652

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.5

Comments:

Examination Outline Cross-reference:		
	Question #	45
	Tier #	2
	Group #	1
	K/A #	003.K1.01
	Importance Rating	2.8

Proposed Question:
The plant has been operating at 100% power steady state for several weeks, when the Control Room crew determines that the "A" Reactor Coolant Pump (RCP) upper oil reservoir level has just started to slowly and steadily increase.

What is the cause and effect of the increasing level?

A. Reactor Plant Component Cooling Water (RPCCW) is leaking into the reservoir. The pump will lose lubrication.

B. The RCP Lift Oil Pump has tripped, allowing oil to drain back to the reservoir. The pump will lose lubrication

C. The oil reservoir automatic level control valve is malfunctioning. Pump lubrication will be maintained.

D. Wear of the upper radial bearing is reducing oil flow, backing up oil into the reservoir. Pump lubrication will be maintained.

Proposed Answer: A

Explanation (Optional):
"A" is correct. OP3353.MB4B 4-2A has operators check RPCCW surge tank for indications of in-leakage. "B" is wrong, the lift oil pumps are only operated during RCP starts. "C" is wrong, there is no LCV for the oil reservoir. "D" is wrong, radial bearing wear will cause oil flow to increase due to increased mechanical clearances.

Technical Reference(s): OP3353.MB4B 4-2A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05288 Describe the function and location of the ... Upper and Lower Oil Reservoirs (As available)

Question Source:	Bank #	70675
Question Cognitive Level:	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41.3 and 41.5	

Comments:

Examination Outline Cross-reference:		
	Question #	46
	Tier #	2
	Group #	1
	K/A #	004.K2.06
	Importance Rating	2.7

Proposed Question:
PLANT CONDITIONS:

- 100% power
- All systems are in AUTOMATIC
- LT-459 is selected for Pressurizer level control
- PT-456 is selected for Pressurizer pressure control

A loss of VIAC-1 occurs.

What impact will the loss of VIAC 1 have on PZR pressure and level control?

A. The PZR master pressure controller will have to be taken to MANUAL only.

B. The charging line flow control valve/PZR level controller will have to be taken to MANUAL only.

C. The PZR pressure controller will have to be taken to MANUAL, and the "A" PZR PORV will no longer function in AUTOMATIC.

D. The charging line flow control valve/PZR level controller will have to be taken to MANUAL and letdown will have to be restored.

Proposed Answer: D

Explanation (Optional):
"D" is correct, since LT459 is powered from VIAC 1. It also feeds the low PZR level letdown isolation signal ("B" wrong). PZR pressure is not affected because its controlling channel is powered by VIAC 2 ("A" wrong). PORVs are still available, since they require two channels of pressure to indicate high in order to open ("C" wrong).

Technical Reference(s): Functional Dwg # 6, 11, and 18 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05342 Given a failure, partial or complete, of the Pressurizer Pressure and Level Control System, determine the effects on the system and on interrelated systems. (As available)

Question Source: Modified Bank # 1997 Millstone NRC SRO # 34 Parent attached

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.7

Comments:

Original Millstone 3 1997 NRC question SRO-34:

PLANT CONDITIONS:

- 100% power
- All systems in AUTOMATIC
- LT-459 selected for control of Pressurizer level control selected to LT-459
- PT-456 selected for control of Pressurizer Pressure
- Instrument for "A" and "C" steam generators selected to Channel I
- Instruments for "B" and "D" steam generators selected to Channel II

A loss of VIAC-2 occurs.

Which of the following lists controllers which should be taken to MANUAL as a result of the VIAC-2 failure?

A. Rod control
Pressurizer Pressure
Pressurizer Level

B. Rod Control
Pressurizer Pressure
Master main feed pump controller

C. Pressurizer Pressure
Pressurizer Level
Feed Regulating Valves for "A" & "C" SGs

D. Pressurizer Pressure
Master main feed pump controller
Feed Regulating Valves for "B" & "D" SGs

ANSWER: D

Examination Outline Cross-reference:	Question #	47
	Tier #	2
	Group #	1
	K/A #	004.K6.07
	Importance Rating	2.8

Proposed Question:

The plant is at 100% power when the RO notices letdown flow oscillating due to flashing downstream of the letdown orifices.

What could have caused the flashing to occur?

A. The Regenerative Heat Exchanger has developed a tube leak.

B. 3CHS*PCV131, Letdown Pressure Control Valve, has failed closed.

C. RPCCW flow to the Letdown Heat Exchanger has increased.

D. 3CHS*FCV121, Charging Line Flow Control Valve, has failed closed.

Proposed Answer: D

Explanation (Optional):

Flashing will occur downstream of the orifices if the letdown stream is not adequately cooled in the regenerative heat exchanger, or if pressure drops excessively. "A" is wrong since a tube leak results in colder charging water leaking into the letdown line. "B" is wrong since this raises pressure downstream of the orifices. "C" is wrong since this cools the letdown stream. "D" is correct since this removes cooling to the regenerative heat exchanger, reducing cooling to the letdown steam.

Technical Reference(s): P&ID 104A (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04201 Describe the major administrative or procedural precautions and limitations placed on the operation of the Chemical and Volume Control (As available)

Question Source: Bank # 68582

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41

Comments:

Examination Outline Cross-reference:	Question #	48 (SRO)
	Tier #	2
	Group #	1
	K/A #	013.GEN.2.2.22
	Importance Rating	4.1

Proposed Question:
Initial conditions:

- The plant is in MODE 0.
- Fuel movement is in progress in the fuel pool.
- Rigging is in progress in the Control Building 64' level.

The control room receives a report that the riggers lost control of their load and damaged "Control Room Makeup Air Supply" radiation monitor 3HVC*RE16B. The RO reports that 3HVC*RE16B is **NOT** functioning.

What ACTION, if any, is required?

A. No ACTION is required, since the plant is in MODE 0.

B. No ACTION is required, since 3HVC*RE16A is available.

C. Restore 3HVC*RE16B to OPERABLE within 7 days.

D. Immediately suspend fuel movement.

Proposed Answer: C

Explanation (Optional):
This is a new change to Technical Specifications based on a re-evaluated fuel handling analysis. "C" is correct, and "A" and "B" are wrong, since the ACTION applies with the number of operable channels 1 less than the total in MODES1-6, or with fuel movement in progress. "B" is plausible, since the requirement previously was less than the minimum operable channels. "A" is plausible, since previously the applicable modes were "All", and Technical Specifications do not define MODE 0. Now, it reads MODES 1, 2, 3, 4, 5, and 6 and during fuel movement within containment or the spent fuel pool". "D" is plausible since this is the action required for loss of both channels.

Technical Reference(s): Tech Spec 3.3.2 ESFAS Inst. ACTION 18 (Attach if not previously provided)
Tech Spec Table 3.3-3

Proposed references to be provided to applicants during examination: Tech Specs Sections 3/4

Learning Objective: MC-04765 Given a plant condition or equipment malfunction, use provided reference materials to evaluate Technical Specification applicability and required actions. (As available)

Question Source: New
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.43.2
Comments:

Examination Outline Cross-reference:		
	Question #	49
	Tier #	2
	Group #	1
	K/A #	014.K1.01
	Importance Rating	3.6

Proposed Question:
While operating at 90% power, a control bank "D" Group 1 rod becomes misaligned higher than the rest of its group.

The crew has entered AOP 3552, "Malfunction of the Rod Drive System" and is currently aligning the affected rod to the rest of the bank.

Prior to moving the affected bank, the procedure requires the operators to insert the affected rod until the next lower DRPI LED changes state.

Which of the following describes the reason for inserting the control rod?

A. To reset the logic cabinet master cycler to ensure proper rod stepping when the affected rod is aligned to the group.

B. To accurately determine the actual rod position prior to realigning the affected bank.

C. To accurately determine how far the affected rod is misaligned to verify compliance with Technical Specifications.

D. To ensure when the affected rod is realigned, it will be within 3 steps of actual position of the bank.

Proposed Answer: B
Explanation (Optional): The coils are placed 6 steps apart with the LED positioned 1/2 the distance between the coils. As the rod steps through the coil, the LED above the coil will light. The band is 2 steps above and 3 steps below the indicated position. With the actual position o the bank rod now located, the affected rod can then be inserted to the same height as the rest of the rods in the group. ("B" correct)
Technical Reference(s): AOP 3552 Basis Doc, Att. A, step 6 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05484 Describe the operation of the Rod Position Indication System under the following Normal, Abnormal, and Emergency conditions... Stuck, Misaligned, or Dropped Rod (including recovery operations)... (As available)

Question Source: Bank # 72414
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.2, 41.6
Comments:

Examination Outline Cross-reference:		
	Question #	50
	Tier #	2
	Group #	1
	K/A #	015.K1.08
	Importance Rating	2.9

Proposed Question:
During the Three Mile Island event, with core uncovery in progress, the crew started a reactor coolant pump.

Immediately after starting the RCP, source range counts dropped rapidly from $5x10^4$ cps to $5x10^3$ cps.

Why did source range counts drop?

A. Molten core material relocated to the bottom of the core.

B. Borated water added negative reactivity to the core.

C. A slug of cold water filled the vessel downcomer.

D. Increased voiding added negative reactivity to the core.

Proposed Answer: C

Explanation (Optional):
"C" is correct, since crossover leg water refilled the vessel downcomer, shielding excore NIS from neutrons. Previously, source range counts had increased as the core voided, due to less neutron attenuation. The crew had concerns that a restart accident was in progress. "A" is wrong, since the SR detectors are near the bottom of the core, and counts increased as the core relocated. "B" and "D" are wrong, since the core was already adequately shutdown.

Technical Reference(s): Westinghouse MITCORE Text, pg 9.12.K (Attach if not previously provided)
Westinghouse MITCORE Text, Figure 9.10

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04954 Describe the effects on Reactor kinetics of coolant voiding in the core region, and relate the excore nuclear instrumentation system response to voiding. (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.2, 3, 5, 6, 7, and 9
Comments:

Examination Outline Cross-reference:		
	Question #	51
	Tier #	2
	Group #	1
	K/A #	015.K6.05
	Importance Rating	2.6

Proposed Question:
Refueling is in progress with Westinghouse NIS providing audible SR counts indication to both the Control Room and Containment with the following NIS switch positions selected:

- The "Channel Selector Switch" on the "Audio Count Rate" drawer is in the "N-31" position.
- The "W/GM1/GM2" selector switch on "A" Train Shutdown Margin Monitor Drawer is in the "W" position.
- The "Amplifier Selector" switch on the rear of the "Audio Count Rate" drawer is in the "Normal" position.
- The "Audio Level Control" knobs on both SMM Drawers are at "Minimum".
- The "Audio Multiplier Switch" on the "Audio Count Rate" drawer is in the "10" position.

The "Audio Multiplier Switch" on the "Audio Count Rate" NIS drawer is inadvertently taken from the "10" position to the "Off" position.

How will this error affect both the main board 4 Source Range count indication, and the audio countrate indications to both CTMT and the control room?

A. MB4 SR indication will be lost; and audible countrates will be lost to both Containment and the control room.

B. MB4 SR indication will be lost; and audible countrates will be lost to Containment and maintained in the control room.

C. MB4 SR indication will be maintained; and audible countrate will be lost to Containment and maintained in the control room.

D. MB4 SR indication will be maintained; and audible countrate will be lost to both Containment and the control room.

Proposed Answer: D
Explanation (Optional): CTMT audible counts are lost, since the "W/GM1/GM2" selector switch receives the Westinghouse signal downstream of the "Audio Multiplier Switch" for the CTMT speaker. Control Room audible counts are lost, since the "Audio Multiplier Switch" supplies the control room speaker as well ("B" and "C" are wrong). Source Range indication on the mainboards does not go through the audio multiplier switch ("D" correct and "A" is wrong).
Technical Reference(s): Figure NIS015T-010 (Attach if not previously provided)
Proposed references to be provided to applicants during examination: None
Learning Objective: MC-05221, Describe the function... of the following... Audio Count Rate/ Timer-Scaler... Containment Speakers...Gamma-metrics Drawer... (As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.7
Comments:	

Examination Outline Cross-reference:		
	Question #	52
	Tier #	2
	Group #	1
	K/A #	017.A4.02
	Importance Rating	4.1

Proposed Question:

The plant is experiencing an inadequate core cooling condition, and the crew has entered EOP 35 FR-C.1 "Response to Inadequate Core Cooling".

The crew is currently checking if RCPs should be started to provide forced cooling to the core.

What is the minimum temperature at which the crew will be directed by procedure to start RCPs?

A. Core Exit Thermocouples > 718°F.

B. Core Exit Thermocouples > 1200°F.

C. RCS Hot Leg temperature > 718°F.

D. RCS Hot Leg temperature > 1200°F.

Proposed Answer: B

Explanation (Optional):
"B" is correct, since CETCs > 1200°F is the criterion ("B" correct, "A" wrong). Hot leg temperatures should not be used, since they may react significantly slower than CETCs ("C" and "D" wrong).

Technical Reference(s): FR-C.1, step 17 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04524 Describe the major action categories within EOP 35 FR-C.1 (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.7, 41.10
Comments:

Examination Outline Cross-reference:		
	Question #	53
	Tier #	2
	Group #	1
	K/A #	022.GEN.2.1.32
	Importance Rating	3.8

Proposed Question:
With the plant at 100% power, one of the two running Reactor Plant Chilled Water (CDS) pumps trips, resulting in one of the running chillers to trip as well.

As the CDS cooling water for CTMT ventilation systems heats up, which system limit will be the first concern for the crew?

A. Reaching a CTMT temperature Technical Specification limit.

B. Reaching a CTMT pressure Technical Specification limit.

C. Reaching a high temperature limit on the Reactor Coolant Pumps.

D. Reaching a high temperature limit on the Control Rod Drive Mechanisms.

Proposed Answer: B

Explanation (Optional):
"A" is wrong, since CDS supplies the CAR coolers in CTMT, so as CDS heats up, CTMT temperature increases, which also raises CTMT pressure. CTMT pressure has much less margin than temperature before reaching the Tech Spec limit (B correct, "A" wrong). "C" and "D" are wrong since RCPs and CRDMs will not experience immediate problems since the associated coolers cool the hot air exhausting from these heat loads. **This is similar to an event at Millstone 3 on 8/2/99.**

Technical Reference(s): P&ID 122A & 122B (Attach if not previously provided)
Millstone 3 CR M3-99-2843

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04189 Given a failure, partial or complete, of the reactor plant chilled water system, determine effects on the system and on interrelated systems. (As available)

Question Source:	Bank #	73616
Question Cognitive Level:	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41.10	
	55.43.2	

Comments:

Examination Outline Cross-reference:		
	Question #	54
	Tier #	2
	Group #	1
	K/A #	026.K3.02
	Importance Rating	4.3

Proposed Question:
The plant has tripped due to a LOCA, and the following sequence of events occurs:

0800: The crew enters E-0
0812: CDA actuates.
0813: The RO reports that neither QSS pump can be started.
0816: The crew enters FR-Z.1 "Response to High CTMT Pressure".
0818: The STA reports CTMT wide range sump level is 1 foot.

How is the operation of the RSS system affected by the QSS system failure?

A. All RSS pumps will all be placed in Pull-To-Lock, since inadequate sump level exists. RSS Pump "C" or "D" will be aligned to take a suction on the RWST to spray CTMT, since "A" and "B" RSS pumps have a recirc path and are preferred for supplying cold leg recirc.

B. All RSS pumps will all be placed in Pull-To-Lock, since inadequate sump level exists. RSS Pump "A" or "B" will be aligned to take a suction on the RWST to spray CTMT, since "A" and "B" RSS pumps have a recirc path, and are preferred for supplying spray.

C. All RSS pumps will be manually started after 11 minutes have elapsed, since the CDA signal did not fully actuate. RSS Pump "C" or "D" will be aligned to take a suction on the RWST to spray CTMT, since "A" and "B" RSS pumps have a recirc path and are preferred for supplying cold leg recirc.

D. All RSS pumps will be manually started after 11 minutes have elapsed, since the CDA signal did not fully actuate. RSS Pump "A" or "B" will be aligned to take a suction on the RWST to spray CTMT, since "A" and "B" RSS pumps have a recirc path and are preferred for supplying spray.

Proposed Answer: A

Explanation (Optional):
Without QSS, the steam in CTMT will not condense as rapidly into the CTMT sump, and RWST water will not be added as rapidly to the CTMT sump, so RSS pumps are placed in PTL, since inadequate sump level exists ("A" correct, "C" and "D" wrong). "C" and "D" are preferred for spray, since "A" and "B" are preferred for recirc ("A" correct, "B" wrong).

Technical Reference(s): P&ID 112C (Attach if not previously provided)
EOP35 FR-Z.1, steps 7 and 8

Proposed references to be provided to applicants during examination: None

Learning Objective:	MC-04668 Discuss the basis of major procedure steps and/or sequence of s temp in EOP 35 FR-Z.1.	(As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.7, 41.10

Comments:

Examination Outline Cross-reference:		
	Question #	55
	Tier #	2
	Group #	1
	K/A #	026.A3.02
	Importance Rating	4.2

Proposed Question:
A CDA occurred and the crew is progressing through the EOP network. The CTMT Recirc (RSS) pumps have just started, and the RO is verifying that equipment is in the desired lineup.

What should be the position of the RPCCW heat exchanger service water inlet isolation valves (3SWP*MOV50A/B), and the service water inlet valves to the containment recirc coolers (3SWP*MOV54A/B/C/D)?

A. Both the RPCCW heat exchanger service water inlet isolation valves and the service water inlet valves to the containment recirc coolers should be OPEN.

B. The RPCCW heat exchanger service water inlet isolation valves should be OPEN and the service water inlet valves to the containment recirc coolers should be CLOSED.

C. The RPCCW heat exchanger service water inlet isolation valves should be CLOSED and the service water inlet valves to the containment recirc coolers should be OPEN.

D. Both the RPCCW heat exchanger service water inlet isolation valves and the service water inlet valves to the containment recirc coolers should be CLOSED.

Proposed Answer: C
Explanation (Optional): "C" is correct, since on a CDA, the RPCCW heat exchanger service water inlet isolation valves receive a CLOSE signal, to prevent excessive flow for the service water pumps. The service water inlet valves to the containment recirc coolers receive an OPEN signal to provide cooling to the CTMT sump water being recirculated. "A" is plausible, since this also supplies cooling to the RSS heat exchangers. "B" and "D" are plausible since there is a 3 minute time delay prior to 3SWP-MOV54C opening, but since the RSS pumps are running, at least 11 minutes has passes since the CDA actuated.

Technical Reference(s): LSK-9-1G and 27-11L (Attach if not previously provided)
P&ID 133B

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05718 Describe the operation of the Service Water System under the following normal, abnormal, and emergency conditions... Ctmt Depressurization Actuation (As available)

Question Source: Bank # 69683
Question History: Last NRC Exam
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.7
Comments:

Examination Outline Cross-reference:		
	Question #	56
	Tier #	2
	Group #	1
	K/A #	056.A2.05
	Importance Rating	2.5

Proposed Question:
While operating at 100% power, the unit experiences a catastrophic failure of the 6B Feedwater Heater extraction steam bellows. The following alarms and indications are promptly received:

- CONDENSATE CONDUCT HI - MB6A 3-8
- HOTWELL SODIUM HI - MB6A 4-8
- COND DEMIN SYSTEM TROUBLE - MB6A 1-6
  - COMMON INFLUENT CONDUCTIVITY HIGH - CD 5-1
  - COMMON EFFLUENT CONDUCTIVITY HIGH - CD 5-2
- Unit Electrical output has decreased by 5 MWe

Which of the following is the most probable result of this event, and what is the correct mitigation strategy?

A. The bellows failure has created debris and ruptured the main condenser structure. The crew will use AOP 3559 "Loss of Main Condenser Vacuum" to shutdown the plant when backpressure is greater than 5 " Hg Abs.

B. The bellows failure has created debris and caused a chemistry excursion. The crew will use OP 3319C "Condensate Demineralizer Mixed Bed System" to swap clogged demineralizers.

C. The bellows failure has created debris and caused condenser tube leakage. The crew will use AOP 3557 "Secondary Chemistry" to shutdown the plant if recommended by Chemistry.

D. The bellows failure has created debris and disrupted the extraction steam flow. The crew will use AOP 3567 "Operation with One Heater String Isolated" to isolate the B Low Pressure Heater string and return the unit to full power.

Proposed Answer: C

Explanation (Optional):
Event is based on industry operating experience. Each distracter contains a contains a plausible result and remedy, but "A" is wrong, since significant conductivity problems exist. "B" and "D" are wrong, due to conductivity alarms and Mw loss. "C" is correct, since AOP 3557 contains entry conditions (alarms) and shutdown recommendation.

Technical Reference(s):	AOP 3557 Secondary Chemistry, Entry Conditions, and steps 1-5 Operational Experience, O&MR 434, Extraction Steam Bellows Failure	(Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05899 Identify conditions that require entry into AOP 3557. (As available)

Question Source: New
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.5
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	57
	Tier #	2
	Group #	1
	K/A #	059.K3.03
	Importance Rating	3.7

Proposed Question:
INITIAL CONDITIONS:

- Power is being increased from 90% to 100% in accordance with OP-3204 "At Power Operation".
- Both turbine driven feedwater pumps are operating.
- Two condensate pumps are in service.
- 6 condensate demineralizers are in service.

A malfunction has caused the recirc valve for the "B" TDMFW pump to travel to the full open position.

Without operator action, what impact might this failure have on plant conditions?

A. SG Lo-Lo level resulting in a reactor trip.

B. Lowering demineralizer d/p resulting in degrading SG chemistry.

C. Standby condensate pump start, preventing a reactor trip.

D. Auto start of the MDFW pump, preventing a reactor trip.

Proposed Answer: A

Explanation (Optional):
Millstone 3 OE has shown that the maximum number of condensate demineralizers should be available to provide adequate feed pump suction flow when increasing feed flow, since condensate pump flow is limited by the number of demins in service. The recirc valve opening will cause condensate flow to increase by 5,400 gpm. Without operator action to start the standby condensate pump or open the demin bypass valve, the added condensate flow due to recirc flow back to the condenser will cause demineralizer d/p to increase ("B" incorrect), and suction pressure to the feed pumps to decrease. The feed pump speed will increase, attempting to restore Feed Reg Valve DP, further lowering feed pump suction pressure. After 30 seconds the feed pumps will trip on low suction pressure ("A" correct). The MDFW pump may auto start on low discharge pressure (less than 955 psig), but this will aggravate the low suction pressure condition ("D" incorrect).

Technical Reference(s): OP 3353.MB5C, 3-4 and 3-5 (Attach if not previously provided)
OP 3321, step 4.3.3, 4.3.35

Proposed references to be provided to applicants during examination: None

Learning Objective:	MC-04660 DESCRIBE the operation of the following Main Feedwater & Steam Generator Water Level Control Systems Controls & Interlocks... Main Feed Pump Recirculation Valves (FWR-FV21A/B, FV20)... Turbine Driven Main Feed Pump Master Speed Controller (FWS-SK509A)... Low Main Feed Pump Suction Pressure Interlock... Low Main Feed Pump Discharge Pressure Interlock...	(As available)

Question Source:	Bank #	69604
Question History:	Previous NRC Exam	
Question Cognitive Level:	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41.5, 41.7	

Comments:

Examination Outline Cross-reference:	Question #	58 (SRO)
	Tier #	2
	Group #	1
	K/A #	061.GEN.2.2.24
Proposed Question:	Importance Rating	3.8

INITIAL CONDITIONS:

- The plant is at 100% power.
- The Turbine Driven Auxiliary Feedwater Pump (Terry Turbine) was removed from service one hour ago for preventative maintenance.
- All other equipment is in service.

The following sequence of events occurs:

1. Maintenance reports that both MDAFW pumps had improper lube oil added during the last lube oil change, and the SM declares both pumps INOPERABLE.
2. Operations and Maintenance Dept immediately commence efforts to restore the AFW pumps to OPERABLE.

For this condition, what ACTION is required by Technical Specifications concerning reaching HOT STANDBY?

A. Be in at least HOT STANDBY within 6 hours.

B. Within 1 hour initiate action to be in a MODE where the specification does no apply, and be in at least HOT STANDBY within the next 6 hours.

C. Restore at least one AFW pump to OPERABLE within 72 hours or be in at least HOT STANDBY within the next 6 hours.

D. Shutdown to HOT STANDBY is not required.

Proposed Answer: D

Explanation (Optional): "D" is correct, per LCO 3.7.1.2 ACTION c. This requires immediate action to restore at least one AFW pump to OPERABLE, which is already in progress. "A" is wrong, but plausible, since 3.7.1.2 ACTION b applies with two INOP AFW pumps. "B" is wrong, but plausible since this applies if LCO 3.0.3 is in effect. "C" is wrong, but plausible since LCO 3.7.1.2 ACTION a applies with a single INOP AFW pump.

Technical Reference(s): Tech Spec 3.7.1.2 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Tech Spec Sections 3/4

Learning Objective: MC-04837 The crew operates the plant in compliance with all applicable plant procedures and technical specifications (As available)

Question Source: New

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.43.2

Comments:

Examination Outline Cross-reference:	Question #	59 (SRO)
	Tier #	2
	Group #	1
	K/A #	063.GEN.2.2.22
	Importance Rating	4.1

Proposed Question:
With the plant at 100% power and Battery Charger 8 out of service for maintenance, the following sequence of events occurs:

An electrical fault occurs on Battery Bus #3
1. The "Battery 3 Trouble" annunciator lights on MB8.
2. The BOP reports Battery Bus #3 voltage on MB8 indicates zero.
3. The PEO reports that the Battery supply breaker to Battery bus #3 has tripped open.
4. The PEO reports that the DC output breaker has tripped open from Charger 3BYS*CHGR-3.

For this condition, how long does the crew have to reach HOT STANDBY?

A. Reenergize the DC bus from the battery within 2 hours or be in HOT STANDBY within the next 6 hours.

B. Reenergize the DC bus from the battery within 8 hours or be in HOT STANDBY within the next 6 hours.

C. Restore the Battery and the Charger to OPERABLE status within 2 hours or be in HOT STANDBY within the next 6 hours.

D. Restore the Battery and the Charger to OPERABLE status within 24 hours or be in HOT STANDBY within the next 6 hours.

Proposed Answer: A
Explanation (Optional): "A" is correct, since the DC bus is not energized from its battery bank, making LCO 3.8.3.1 ACTION c apply. "B" is wrong, but plausible, since this is the action of LCO 3.8.3.1 ACTION a if an emergency bus is deenergized. "C" is wrong, but plausible since this is the action of LCO 3.8.2.1 ACTION a if Battery Bank 1 or 2 is inoperable. "D" " is wrong, but plausible since this is the action of LCO 3.8.2.1 ACTION b if Battery Bank 3 or 4 is inoperable, and this is less restrictive than LCO 3.8.3.1 ACTION a..

Technical Reference(s): LCO 3.8.2.1 (Attach if not previously provided)
LCO 3.8.3.1

Proposed references to be provided to applicants during examination: Tech Spec Sections 3/4

Learning Objective: MC-03951 Given a plant condition requiring the use of AOP-3563, identify applicable technical specification action requirements. (As available)

Question Source: Bank # 68683
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.43.2
Comments:

Examination Outline Cross-reference:		
	Question #	60 (SRO)
	Tier #	2
	Group #	1
	K/A #	068.K1.05
	Importance Rating	2.6

Proposed Question:
The SM is preparing to authorize the discharge of the "A" Low Level Waste Drain Tank (LLWDT). Current conditions are as follows:

- The plant is in MODE 5.
- An "A" train electrical outage is in progress.
- The "D" Main Circulating Water Pump has been disassembled for bearing replacement.
- The "B" main circulating pump has just tripped, and can not be restarted.
- Both the "A" and the "B" Low Level Waste Drain Tanks (LLWDTs) are full.
- The "A" LLWDT was recirculated for 40 minutes, as annotated on the discharge permit.
- The tide is coming in.
- All other plant conditions are normal, and all other actions related to the discharge are acceptable.

Which of the following actions should the SM take concerning the discharge of the "A" LLWDT?

A. Authorize the discharge. All requirements are met.

B. Do not authorize the discharge. No provision exists for a discharge during incoming tides.

C. Do not authorize the discharge. Tank recirculation requirements are not met.

D. Do not authorize the discharge. Insufficient dilution flow exists.

Proposed Answer: D
Explanation (Optional): "A" is wrong, and "D" correct, since 3 of the 6 circ pumps are not available due to the "A" train outage, and one is not available due to maintenance. Only one circ pump is running after the "B" pump tripped. While shutdown, the requirement is 2 circ pumps and a service water pump. "B" is wrong, but plausible, since it is desirable to perform discharges during ebb tides, but needs of the station may preclude this. "C" is wrong since 40 minutes is the time required for recirculating the Low Level Waste Drain Tank. "C" is plausible since the WTT requires a 175 minute recirc time.

Technical Reference(s): OP 3335D, step 4.23 (Attach if not previously provided)
OP 3335D, section 4.2.5
OP 3325A, Precaution 3.2

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04867 Describe the major administrative or procedural precautions and limitations placed on the operation of the LWS system, and the basis for each. (As available)

Question Source: Modified question 75648 Parent attached

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.10
55.43.4, 43.5

Comments:

Original question 75648

Current Conditions:

- Reactor power is 100%.
- A thermal backwash is in progress on the "A" Waterbox.
- The tide is coming in.
- Both the "A" and the "B" Waste Test Tanks (WTTs) are full.
- The SM is preparing to authorize the discharge of the "A" WTT.
- The "A" WTT was recirculated for 40 minutes, as annotated on the discharge permit.
- All other plant conditions are normal, and all other actions related to the discharge are acceptable.

Which of the following actions should the SM take concerning the discharge of the "A" WTT?

A. Authorize the discharge. All requirements are met.

B. Do not authorize the discharge. Discharges are only allowed during ebb tides.

C. Do not authorize the discharge. Tank recirculation requirements are not met.

D. Do not authorize the discharge. Insufficient dilution flow exists.

Answer: C

Examination Outline Cross-reference:		
	Question #	61
	Tier #	2
	Group #	1
	K/A #	071.A4.14
	Importance Rating	3.0

Proposed Question:
With the plant at 100% power the following annunciators are received in the control room:

- Main Board 1B, 3-3, "RAD GASEOUS WASTE SYS TROUBLE".
- Main Board 6A, 2-10, "AUX COND CONDUCT HI".

A PEO is dispatched, and he reports that the local annunciator is Gaseous Waste Panel annunciator 2-6, "GAS WASTE FEED PREHTR OUT COND HI".

What are all of the automatic responses that the operators should expect from the alarms?

A. Degasifier Feed Preheater Steam Supply Valve (3ASS-TV31) closes.

B. Degasifier Feed Preheater Steam Supply Valve (3ASS-TV31) closes, and Degasifier Preheater Condensate Divert Valve (3CNA-AOV46) diverts to the Auxiliary Building Sump.

C. Degasified Stream Outlet Valve (3GWS-AOV54) transfers to Boron Recovery System.

D. Degasified Stream Outlet Valve (3GWS-AOV54) transfers to Boron Recovery System, and Volume Control Tank to Degasifier Letdown Valve (3CHS-AOV71) transfers to the VCT.

Proposed Answer: B

Explanation (Optional):
Upon receipt of high conductivity, 3CNA-AOV 46 diverts to the Aux Building Sump AND 3ASS-TV31 closes ("B" correct, "A" wrong). "C" and "D" are wrong, and plausible, since numerous alarms and conditions (such as degasifier high level) cause these valves to auto reposition to the positions listed above.

Technical Reference(s): P&ID 109A and 135C; OP 3353.GW (2-6); OP3353.MB6A (2-10) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04733 Given a failure, partial or complete, of the GWS system, determine the effects on the system and on interrelated systems. (As available)

Question Source: Bank # 60456

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.7

Comments:

Examination Outline Cross-reference:	Question #	62 (SRO)
	Tier #	2
	Group #	1
	K/A #	PLANT SPECIFIC
	Importance Rating	N/A

Proposed Question:
With the plant at 100% power, the following sequence of events occurs:

1. The N-16 ALERT annunciator on MB2 comes in for the "D" SG, with 40 gpd leakage.
2. The crew enters AOP 3576 "Steam Generator Tube Leak".
3. The leak is verified by an increasing trend on Air Ejector Rad Monitor 3ARC-RE21.
4. The N-16 "Rate of Change" annunciator comes in.

What actions are directed by AOP 3576?

A. Request Chemistry to perform SP3861 "Primary to Secondary Leak Rate Determination" at the specified frequency while continuing with normal plant operations.

B. Reduce leakage to within Tech Spec limits within 4 hours or be in at least HOT STANDBY within the next 6 hours.

C. Go to OP 3204 "At Power Operation" or AOP 3575 "Rapid Downpower" and be in MODE 3 within approximately 6 hours.

D. Go to AOP 3575 "Rapid Downpower", reduce power to < 50% within 1 hour, and be in MODE 3 within the next 2 hours.

Proposed Answer: D

Explanation (Optional): "A" is wrong, since this action is performed with the ARC-21 setpoints reset AND clear. The given leak rate (40 gpd and increasing) is less than the TS limit of 500 gpd through the affected SG ("B" wrong). "D" is correct, since this is required with the "rate of increase" alarm. "C" is wrong, since the crew is directed to commence a plant shutdown using OP 3204 or AOP 3575 to get to MODE 3 within approximately 6 hours with greater than 150 gpd leakage.

Technical Reference(s): AOP 3576, steps 7- 9 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Tech Spec sections 3/4

Learning Objective: MC-00189 Discuss conditions which require transition to other procedures from AOP 3576. (As available)

Question Source: Bank # 74488

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	63
	Tier #	2
	Group #	2
	K/A #	006.A2.08
	Importance Rating	3.3

Proposed Question:
With the plant at 100% power, the following sequence of events occurs:

1. An earthquake occurs, resulting in both a 34C bus differential, and a small break LOCA.
2. The crew transitions to ES-1.2 "Post LOCA Cooldown and Depressurization".
3. The crew is preparing to isolate accumulators per ES-1.2, step 22 "Check if Accumulators Should Be Isolated".

What will be the impact of the loss of bus 34C on the performance of step 22?

A. The crew will not need to isolate the "A" and "C" accumulators, since the isolation valves did not open on the SIS signal.

B. The crew will not need to isolate the "A" and "C" accumulators, since the isolation valves failed closed.

C. The crew will be unable to close the isolation valves for the "A" and "C" accumulators. The crew will mitigate this by venting nitrogen off of both of these accumulators.

D. The crew will be unable to close the isolation valves for the "A" and "C" accumulators. The crew will also not be able to vent nitrogen off of these accumulators.

Proposed Answer: C
Explanation (Optional): Accumulators must be isolated to prevent N2 injection into the RCS. "A" and "C" accm isol valves are normally open MOVs powered from "A" Train 480VAC, so they can not be closed on loss of power ("A" and "B" wrong). ES-1.2 directs the crew to vent the unisolable accumulators, and this is possible, since the vent valves are in parallel for each accumulator, powered from opposite train 125VDC power ("C" correct, "D" wrong).

Technical Reference(s):	ES-1.2, step 22.	(Attach if not previously provided)
	EOP 35 GA-7 Isolating Accumulators	
	P&ID 112B	

Proposed references to be provided to applicants during examination: None

Learning Objective:	MC-062809 Given a failure, partial or complete, of the Emergency Core Cooling System, determine the effects on the system and on interrelated systems.	(As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.5, 41.8, and 41.10
Comments:	

Examination Outline Cross-reference:	Question #	64
	Tier #	2
	Group #	2
	K/A #	010.A4.03
	Importance Rating	3.8

Proposed Question:
Initial conditions:

1. The reactor tripped and safety injection actuated .
2. The crew is in E-1 "Loss of Reactor or Secondary Coolant", checking if ECCS flow should be reduced.

PORV 3RCS-PCV455A fails OPEN.

How will the crew diagnose which PORV is open; and what action does E-1 direct the crew to take to isolate flow through the PORV?

A. The PORV is verified open by its tail piece temperature indication on MB4, and flow is isolated by going to CLOSE on the PORV control switch on MB4.

B. The PORV is verified open by its tail piece temperature indication on MB4, and flow is isolated by going to "decrease" on the master pressure controller on MB4.

C. The PORV is verified open by its red indicating light on MB4, and flow is isolated by going to CLOSE on the PORV control switch on MB4.

D. The PORV is verified open by its red indicating light on MB4, and flow is isolated by going to "decrease" on the master pressure controller on MB4.

Proposed Answer: C
Explanation (Optional): PORV indication is via the red indicating light, since the tailpipe temperature indication is common to both PORVs ("A" and "B" wrong). PORV operation is via its control switch, and due to a plant modification, the master pressure controller no longer inputs to the PORV ("C" correct, "D" wrong).

Technical Reference(s): E-1, step 5. (Attach if not previously provided)
P&ID 102C.

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05339 Demonstrate the ability to manually manipulate:... PORV Block Valve and PORV... (As available)

Question Source: 2000 LOIT NRC Question 21

Question History: Millstone 3 2000 LOIT NRC

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.7

Comments:

Examination Outline Cross-reference:		
	Question #	65
	Tier #	2
	Group #	2
	K/A #	011.A1.04
	Importance Rating	3.3

Proposed Question:

The unit has been reducing power from 100%. When the crew stabilizes power, Auctioneered High Tave stabilizes at 568°F.

At what level will the Pressurizer stabilize?

A. 35%

B. 40%

C. 45%

D. 50%

Proposed Answer: B

Explanation (Optional):

"B" is correct since PZR level varies with Tave from 28% to 61.5% linearly as Tave increases from 557°F to 587°F. 568°F is 11°F above no load Tave, so 11/30 = X/33.5. Solving, X = 12.3. 28% + 12.3% = 40.3%. All distractors are plausible since they are within the normal PZR level operating band.

Technical Reference(s): Functional Dwg #11 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05341 Describe the operation of the Pressurizer Pressure and Level Control System under Normal, Abnormal, and Emergency Operating conditions. (As available)

Question Source: Modified Bank # 73123 (Parent attached)

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.5

Comments:

Original Question 73123

PLANT CONDITIONS:

The unit is reducing power from 100% to take the unit off-line.

Loop 3 Tave fails unobserved to a constant output of 572°F.

Assume no operator action taken. Pressurizer level will stabilize at:

A. 22%

B. 28%

C. 45%

D. 89%

Answer: C

Examination Outline Cross-reference:		
	Question #	66
	Tier #	2
	Group #	2
	K/A #	012.K1.07
	Importance Rating	3.2

Proposed Question:

The plant trips from 100% power. Only P-4 Train A actuates.

What will be the final RCS Tavg?

A. 557°F

B. 559°F

C. 561°F

D. 564°F

Proposed Answer: B

P-4 Train A will arm the steam dumps when the reactor trips ("C" and "D" wrong), however, the plant trip controller is not placed in service due to the failure of P-4 train B. The C-7 load rejection controller has a 2°F deadband, so steam dumps return Tave to 2°F above no-load temperature of 559°F (B correct, A incorrect). "C" and "D" are plausible since these are the temperatures that the atmospheric dumps and SG safeties would maintain temperature if the steam dumps did not arm.

Technical Reference(s): Functional sheet 10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05635 Describe the operation of the steam dump system (when in the Tavg mode of operation) during the following normal, abnormal, and emergency conditions: a. Load reject b. Plant trip (As available)

Question Source: Bank # 69323

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.4 through 41.8

Comments:

Examination Outline Cross-reference:		
	Question #	67
	Tier #	2
	Group #	2
	K/A #	016.A2.01
	Importance Rating	3.1

Proposed Question:

INITIAL CONDITIONS:

- Reactor Power is 80%.
- All control systems are in automatic.
- Tave is on program.

RCS Loop 1 narrow range Thot RTD (3RCS*TE411A) fails high.

What is one operator action required as a result of this failure, and one of the reasons why the action is required?

A. Manually increase Charging flow, since Charging flow has decreased.

B. Trip the OTΔT bistable, since the trip setpoint has increased.

C. Reset the Steam dumps, since the steam dumps have ARMed.

D. Cutout the Loop 1 ΔT input, since the RIL setpoint has increased.

Proposed Answer: D

Explanation (Optional): Tave for the affected loop will increase, raising Auctioneered Hi Tave. This raises PZR level stpt, increasing charging ("A" incorrect). OTDT is penalized, lowering the setpoint ("B" incorrect). In Tave mode, steam dumps only arm on a plant trip, or load reject (PT506), ("C" is incorrect). RIL increases since Delta-T increases due to the failure ("D" is correct).

Technical Reference(s): Tech Spec Table 2.2-1 (Attach if not previously provided)
Functional sheets 9, 10, and 11.
AOP 3571, Att. A, step 1.

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05447 Given a failure, partial or complete, of the reactor coolant system, determine the effects on the system and on interrelated systems. (As available)

Question Source: Bank # 64331

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.5
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	68
	Tier #	2
	Group #	2
	K/A #	027.A4.01
	Importance Rating	3.3

Proposed Question:
The crew is responding to a small break LOCA, and the following conditions exist:

- CDA actuated 14 minutes ago.
- CTMT pressure is 16.5 psia and decreasing.
- Alarm lights for both CTMT high range rad monitors (3RMS*RE04A and RE05A) are LIT.
- The crew is at E-1, step 7 "Check if CTMT Spray Should Be Stopped".
- The ADTS has determined that the crew will operate only the "A" QSS pump to reduce CTMT radiation levels.
- RWST level is 800,000 gallons.

Based on current plant conditions, what are the minimum actions physically required by the RO in order to align the QSS pumps so that only the "A" QSS pump will be spraying containment?

A. Reset CDA, take the "A" QSS pump to "START" and back to "AUTO", and open the "A" QSS pump discharge spray valve.

B. Reset CDA, take the "B" QSS pump to "STOP" and back to "AUTO", and close the "B" QSS pump discharge spray valve.

C. Reset SIS and CDA, take the "A" QSS pump to "START" and back to "AUTO", and open the "A" QSS pump discharge spray valve.

D. Reset SIS and CDA, take the "B" QSS pump to "STOP" and back to "AUTO", and close the "B" QSS pump discharge spray valve.

Proposed Answer: B
Explanation (Optional): The QSS pumps are already running from the CDA signal with adequate RWST level ("A" and "C" wrong). Only the CDA signal needs to be reset in order to allow stopping of the pumps ("B" correct, "D" wrong).

Technical Reference(s): E-1, steps 7 and 22. (Attach if not previously provided)
LSK 24-9.4F and 27-12F

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05171 Describe operation of the following containment depressurization system components controls and interlocks: Quench Spray System (QSS)... (As available)

Question Source: New
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.7
Comments:

Examination Outline Cross-reference:	Question #	69
	Tier #	2
	Group #	2
	K/A #	028.GEN.2.1.32
	Importance Rating	3.8

Proposed Question:
A LOCA has occurred, and the crew has started up the hydrogen monitoring system per FR-C.1 "Response to Inadequate Core Cooling".

Assuming a Hydrogen Recombiner is started up, why does OP 3313A "Hydrogen Recombiners" PRECAUTION 3.1 recommend a flow greater than 7.5" of H_2O (3HCS*FI 1A or 1B); and at which of the below CTMT hydrogen concentrations will the crew be directed by FR-C.1 to start a hydrogen recombiner?

A. Flow > 7.5 inches H_2O ensures that the hydrogen in the gas stream does not ignite. The recombiner will be started up with 0.1% CTMT hydrogen concentration.

B. Flow > 7.5 inches H_2O ensures that the hydrogen in the gas stream does not ignite. The recombiner will be started up with 0.5% CTMT hydrogen concentration.

C. Flow > 7.5 inches H_2O ensures adequate equipment protection and performance. The recombiner will be started up with 3.0% CTMT hydrogen concentration.

D. Flow > 7.5 inches H_2O ensures adequate equipment protection and performance. The recombiner will be started up with 6.0% CTMT hydrogen concentration.

Proposed Answer: C

Explanation (Optional):
""C is correct since the recombiner is only operated if hydrogen concentration is between 0.2% ("A" wrong) and 5% ("D" wrong). This range ensures Hydrogen concentration is in a range where either no hydrogen burn is possible, or the burn will be limited to prevent a significant rise in CTMT pressure. Flow greater than 7.5 inches H_2O ensures adequate recombiner equipment protection and performance ("C" correct, "A" and "B" wrong).

Technical Reference(s): OP 3313A, PRECAUTION 3.1 (Attach if not previously provided)
EOP 35 FR-C.1, step 6
WOG Bkgd Doc, FR-C.1, step 8

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04741 Describe the major administrative or procedural precautions and limitations placed on the operation of the HCS system, and the basis for each. (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.10
Comments:

Examination Outline Cross-reference:		
	Question #	70
	Tier #	2
	Group #	2
	K/A #	034.K4.01
	Importance Rating	3.4

Proposed Question:
Fuel movement is in progress in the fuel pool, and the fuel handler is preparing to lift a spent fuel rod that is mechanically bound.

Which of the following spent fuel bridge interlocks will protect the fuel from damage due to the binding?

A. Slack Cable Limit.

B. Fuel Underload Limit.

C. Fuel Overload Limit.

D. Hoist Full Up Limit.

Proposed Answer: C

Explanation (Optional):
"C" is correct, since Fuel Overload interlock will be exceeded if binding of a fuel rod occurs (2000 lbs), stopping the lifting evolution. "A" is wrong, since this interlock stops the crane's downward movement when the weight of the fuel rod is completely supported by the storage rack (200 lbs). "B" is wrong, since the Fuel Underload Limit stops movement as the weight of the load decreases (1500 lbs). "D" is wrong, since Hoist Full Up Limit stops upward motion at a maximum lift height so that the minimum required depth of water shielding depth is maintained.

Technical Reference(s): OP3303A, section 4.2.23 - 4.2.31 (Attach if not previously provided)
OP3303A, Att.1

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04541 Describe the operation of the following Fuel Handling System equipment, controls, and interlocks... Spent fuel bridge crane and hoist... (As available)

Question Source: Modified Bank # 69811 Parent attached
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.7
Comments:

Original 69811

Which of the following spent fuel bridge interlocks requires the Bypass Enable key switch to be positioned to "ON" in order to override the interlock?

A. Slack Cable.

B. Fuel Underload.

C. Hoist Overload.

D. Traverse Travel Limit.

Answer: C

Examination Outline Cross-reference:		
	Question #	71
	Tier #	2
	Group #	2
	K/A #	035.K3.02
	Importance Rating	4.3

Proposed Question:
INITIAL CONDITIONS:

- The crew is performing a plant cooldown in accordance with OP 3208 "Plant Cooldown".
- Tave is 540°F and slowly decreasing.
- PZR pressure is 2110 psia and slowly decreasing.
- S/G pressures are all approximately 950 psig and slowly decreasing.

A small steam break occurs, and the "SG B STEAMLINE PRESSURE LO" annunciator is received on MB5B prior to any further operator action. The "SG B PRESSURE RATE HI" annunciator is NOT received.

What automatic function(s), if any, occur as a result of this alarm condition?

A. No automatic actions occur.

B. Safety Injection Actuation actuates only.

C. Main Steam Line Isolation actuates only.

D. Main Steam Line Isolation and Safety Injection Actuation occur.

Proposed Answer: D
Explanation (Optional): "D" is correct, since Low Steam Pressure SI and MSI are not procedurally blocked until less than 2000 psia [Can not be blocked unless < P-11 (2000 psia)]. "A" is plausible, since the crew will block Low Steam Pressure SI and MSI <2000 psia, and "STEAM PRESSURE RATE HI" did not come in. "B" is plausible since SIS actuates. "C" is wrong, but plausible, since, per MB5B, 2-4, high steam rate will actuate MSI with SIS blocked < P-11.

Technical Reference(s): OP 3353.MB5B, 2-4 and 3-4 (Attach if not previously provided)
Functional Dwgs #7 and 8
OP 3208, step 4.2.5

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05493 Describe the operation of the following RPS controls and interlocks... ESF Actuation Signals... (As available)

Question Source: Modified Bank # 75626 (Note changes or attach parent)

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.7 and 41.10

Comments:

Original question 75626

INITIAL CONDITIONS:

- The crew is performing a plant cooldown in accordance with OP 3208 "Plant Cooldown".
- Tave is 540°F and slowly decreasing.
- PZR pressure is 1900 psia and slowly decreasing.
- S/G pressures are all approximately 950 psig and slowly decreasing.

While attempting to increase the RCS cooldown rate, the BOP operator inadvertently throttles too far open on the Condenser Steam Dumps. The "SG B PRESSURE RATE HI" setpoint is exceeded, and the annunciator is received on MB5B.

What automatic function(s), if any, occur as a result of this alarm condition?

A. No automatic actions occur.

B. Safety Injection Actuation actuates only.

C. Main Steam Line Isolation actuates only.

D. Main Steam Line Isolation and Safety Injection Actuation occur.

Answer: C

Examination Outline Cross-reference:		
	Question #	72
	Tier #	2
	Group #	2
	K/A #	039.A1.07
	Importance Rating	2.6

Proposed Question:
With the crew raising power per OP 3204 "At Power Operations", the BOP operator has been directed to manually place MSR Reheaters in service using OP 3317 "Reheat and Moisture Separator".

Over the course of raising the amount of steam supplied to the reheaters, the BOP observes the following conditions:

- The maximum heatup rate for the "A" reheater tube bundle is 40°F in one hour (3MSS-T39A).
- The maximum heatup rate for the "B" reheater tube bundle is 22°F in 30 minutes (3MSS-T39B).
- The maximum LP turbine inlet steam heatup rate is 80°F in one hour as read on Foxboro DCS.
- Steam temperature entering the LP turbine is 60°F higher on one side than the other side as read on Foxboro DCS.

Which temperature limit has been exceeded?

A. The maximum heatup rate for the "A" reheater tube bundle.

B. The maximum heatup rate for the "B" reheater tube bundle.

C. The maximum LP turbine inlet steam heatup rate.

D. The maximum differential temperature entering the LP turbine.

Proposed Answer: D
Explanation (Optional): The temperature limits for tube bundle heatup rate include a recommended maximum heatup rate limit of 25°F per 30 minutes ("B" wrong) and 50°F per hour ("A" wrong) to prevent thermal stressing of the reheater tube region. The maximum heatup rate on the LP turbine inlet is 125°F per hour ("C" wrong) to prevent LP turbine vibration. The steam temperature entering both sides of the LP turbine must not vary by more than 50°F ("D" correct) to prevent rotor rubbing.

Technical Reference(s): OP 3317, Precaution 3.1 - 3.3; OP 3317, section 4.7 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04992 Describe major administrative or procedural precautions and limitations placed on operation of the moisture separator reheater system, and the basis for each. (As available)

Question Source:	New
Question Cognitive Level:	Memory or Fundamental Knowledge
10 CFR Part 55 Content:	55.41.5

Comments:

Examination Outline Cross-reference:		
	Question #	73
	Tier #	2
	Group #	2
	K/A #	055.GEN.2.1.32
	Importance Rating	3.8

Proposed Question:
With the plant in HOT STANDBY, a PEO is dispatched to investigate a slowly decreasing condenser vacuum. The PEO and BOP operator report the following:

- The "A", "C", and "E" main circulating water pumps are running.
- Gland sealing steam pressure is 0.5 psig.
- There is excessive flow out of the air ejector atmospheric discharge.
- Air ejector suction manifold temperatures are normal.

What is the likely cause of the decreasing vacuum?

A. Insufficient circ water flow to the condenser bays.

B. Insufficient gland sealing steam pressure exists.

C. Loss of steam supply to the SJAEs.

D. The SJAE is backfiring.

Proposed Answer: B
Explanation (Optional): "A" is wrong since one circ pump per bay is adequate in HOT STANDBY, and excessive flow out of the air ejector exists, indicating non-condensable gasses are accumulating in the main condenser. "B" is correct, since the normal gland sealing steam pressure band is 3 to 5 psig, and the AOP checks for between 2 and 6 psig. "C" is wrong, since SJAE flow is greater than normal. "D" is wrong since OP 3329, Precaution 3.1 states that indications of backfiring include decreasing condenser vacuum, elevated SJAE suction manifold temperature, and/or reduced or no flow out of SJAE atmospheric discharge, and excess flow exists. All of the distractors are plausible, since they are conditions that would lead to a decreasing condenser vacuum.

Technical Reference(s): OP 3329, Precaution 3.1 (Attach if not previously provided)
OP 3323D, section 4.3
AOP 3559, steps 2, 3, and 4

Proposed references to be provided to applicants during examination: None

Learning Objectives: MC-04096 Describe the major administrative or procedural precautions and limitations placed on the operation of the condenser air removal system...: MC-06149 Describe the major administrative or procedural precautions and limitations placed on the operation of the gland seal and gland exhaust systems. (As available)

Question Source: Modified bank # 69789 (Parent attached)

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.10

Comments:

Original question 69789

With the plant in HOT STANDBY, a PEO is sent out to investigate a decreasing condenser vacuum. The PEO reports the following:

- There is no flow out of the air ejector atmospheric discharge.
- There is elevated air ejector suction manifold temperatures.

What is the likely cause of the decreasing vacuum?

A. The SJAE is backfiring.

B. Loss of steam supply to the SJAEs.

C. Loss of circ water flow to a condenser bay

D. Loss of condenser vacuum breaker water seal.

Answer: A

Examination Outline Cross-reference:		
	Question #	74
	Tier #	2
	Group #	2
	K/A #	062.A3.01
	Importance Rating	3.1

Proposed Question:

With the plant at 100% power, and swing charger 301B-3 tagged out, an electrical fault in MCC32-2W results in the MCC de-energizing.

All systems respond as designed, and the PEO is checking the effects of the MCC loss on related equipment.

What should inverter 4 output amps to VIAC-4 be indicating, and why?

A. 0 amps, since VIAC-4 has lost power until the PEO manually aligns VIAC-4 to the alternate source via the manual bypass switch.

B. 0 amps, since VIAC-4 has automatically aligned to the alternate source via the static switch.

C. 60 amps, since inverter 4 is receiving power from battery charger 301B-2 via the DC bus.

D. 60 amps, since inverter 4 is receiving power from the battery via the DC bus

Proposed Answer: D

Explanation (Optional):

Voltage at the rectifier output drops to 0 volts (less than 132 VDC) due to the loss of MCC-32-2W, causing the blocking diode to lose the reverse bias, allowing the DC bus to supply power to the inverter without loss of continuity ("D" correct). If the DC bus had not been available, the high speed static switch would automatically transfer to the alternate source upon loss of inverter output power ("B" wrong). When the inverter is out of service, the alternate path may be manually selected via a manual bypass switch ("A" wrong). "C" is wrong since the bus 32-2W supplies both the rectifier and the charger.

Technical Reference(s): EE-1BA (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03305 ...describe the 125 VDC distribution system electrical alignment under the following conditions... Loss of normal AC power supply. (As available)

Question Source:	Bank #	68106
Question Cognitive Level:	Comprehension or Analysis	
10 CFR Part 55 Content:	55.41.7	

Comments:

Examination Outline Cross-reference:		
	Question #	75
	Tier #	2
	Group #	2
	K/A #	064.K2.02
	Importance Rating	3.1

Proposed Question:
The crew is responding to a loss of power using ECA-0.0 "Loss of All AC Power", and the following sequence of events occurs:

1. A PEO starts the "A" EDG using ECA-0.0, Attachment "E".
2. The EDG Output Breaker automatically closes and re-energizes Bus 34C.
3. A PEO reports that the "B" EDG can not be started.
4. After approximately 20 minutes of loaded operation the "DG A Day Tank Level Lo-Lo" annunciator comes in.
5. The PEO reports that the "A" Day Tank Level is 185 gallons and neither of the Fuel Oil Transfer Pumps (3EGF*P1A & 3EGF*P1C) are running.
6. Although power is available, attempts to start the Fuel Oil Transfer Pumps are unsuccessful.

How will the crew fill the "A" EDG Fuel Oil Day Tank?

A. Obtain maintenance department assistance and align hoses from the "B" train Fuel Oil Transfer Pump.

B. Place the 3EGS*PNLA control switch on MCC32-1T-3H to "start" and start the Fuel Oil Transfer Pumps from 3EGS*PNLA.

C. Mechanically align the system, and use Kirk keys to electrically align and operate 3EGF*P1B, Fuel Oil Transfer Pump, from alternate power supply, 32-1T.

D. Mechanically align the system, and use Kirk keys to electrically align and operate 3EGF*P1D, Fuel Oil Transfer Pump, from alternate power supply, 32-1T.

Proposed Answer: D
Explanation (Optional): "A" is wrong since power is not available for the "B" fuel oil transfer pump. "B" is wrong since 3EGS*PNLA contains non-essential loads. This is plausible, since its control switch is on 32-1T, and it is operated when recovering in ECA-0.1. "C" is wrong since 3EGF*P1B does not have an alternate power supply. "D" is correct, since ARP MB8B, 5-3 refers to OP3346B to align 3EGF*P1D to alternate power supply and flowpath.

Technical Reference(s): OP 3353.MB8B, 5-3 (Attach if not previously provided)
FSAR Figure 8.3-6
OP 3346B, sections 4.6 and 4.8.5

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04404 Given a failure (partial or complete) of the Emergency Diesel Generator System, determine the effects on the system and on interrelated systems. (As available)

Question Source: Bank # 75629

Question History:	Previous NRC Exam
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.7
Comments:	

Examination Outline Cross-reference:		
	Question #	76
	Tier #	2
	Group #	2
	K/A #	073.A2.01
	Importance Rating	2.9

Proposed Question:
With the plant at 100% power, the following sequence of events occurs:

T=0: Control Room Ventilation Supply Radiation Monitor 3HVC*RE16A has a momentary loss of power.
T+30 seconds: The RO verifies no actual radiation increase on 3HVC*RE16A and 16B.
T+45 seconds: Based on US direction, the RO resets CBI on MB2.

What action will physically be required in order to restore from this event?

A. Close Control Room Air Bank Isolation Valve 3HVC*SOV74A.

B. Place Emergency Filter Recirc Damper 3HVC*AOD119A in NORMAL.

C. Close Outside Air Isolation Valve 3HVC*AOV25.

D. Open Normal Supply Damper 3HVC*AOD 27A.

Proposed Answer: D

Explanation (Optional):
The momentary loss of power causes a CBI signal, automatically closing the following valves and dampers: Kitchen Exhaust Isolation, Purge Exhaust Isolation, Outside Air Isolation ("C" wrong), and the Normal Supply Damper ("D" correct). After 60 seconds, the Air Bank Isolation opens, but the crew resets CBI prior to 1 minute elapsing, preventing the air bank from discharging ("A" wrong). The Recirc Damper is only placed in "Emergency" manually 1 hour after a required CBI ("B" is wrong).

Technical Reference(s): OP 3314F, section 4.13 (Attach if not previously provided)
Functional Dwg # 8

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05472 Given a failure, of the Radiation Monitoring System (partial or complete), describe the effects on the system and on interrelated systems. (As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.5
	55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	77
	Tier #	2
	Group #	2
	K/A #	075.A4.01
	Importance Rating	3.2

Proposed Question:
Initial Conditions:

- The plant is at 100% power.
- The crew has just started the "C" Service Water Pump 3SWP*P1C and stopped the "A" Service Water Pump on the "A" Train.
- At bus 34C, the "Lead/Follow" switch is still selected to "A-Lead/C-Follow", since the PEO has NOT yet been dispatched to operate the switch.
- The "B" Service Water Pump is running, and selected as the "Lead" pump on the "B" Train.
- All Service Water Pumps are in "AUTO".

A loss of offsite power occurs, and all equipment operates as designed. The RO is monitoring the Main Boards to verify that the proper equipment loads on the emergency busses.

What Service Water Pumps will the RO see starting automatically on Main Board 1?

A. The "A", "B", "C", and "D" Service Water Pumps will start.

B. Only the "A", "B", and "C" Service Water Pumps will start.

C. Only the "A" and "B" Service Water Pumps will start.

D. Only the "B" and "C" Service Water Pumps will start.

Proposed Answer: C
Explanation (Optional): "C" is correct, since only the LEAD Service Water Pumps start on an LOP signal. "A" is plausible, since both of the pumps start on a low discharge pressure signal OR a CDA signal on the affected train. The LOP signal blocks the low pressure start signal. "B" is plausible, since the "A" and "B" pumps are the LEAD pumps. "D" is plausible, since the "B" and "C" pumps were running at the time of the LOP.
Technical Reference(s): LSK 9-10A, 9-10H, 24-9.4A, 24-9.4J (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05714 Describe the operation of the following Service Water System components controls and interlocks: Service Water Pumps.... (As available)

Question Source: New
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.7
Comments:

Examination Outline Cross-reference:	Question #	78
	Tier #	2
	Group #	2
	K/A #	079.2.4.11
	Importance Rating	3.6

Proposed Question:
With the plant at 100% power, instrument air pressure starts decreasing, and the crew enters AOP 3562 "Loss of Instrument Air". The crew is NOT required to trip the plant.

Which level/DP indicators will AOP 3562 direct or caution the crew to monitor for potential inaccurate operation?

A. Condenser Hotwell level and traveling screen DP.

B. Spent Fuel Pool level and Turbine Lube Oil Bowser filter compartment DP.

C. Low Level Waste Drain Tank level and Main Generator Seal Oil / H2 DP.

D. PRT level and Emergency Diesel crankcase vacuum DP.

Proposed Answer: A

Explanation (Optional):
"A" is correct, per AOP 3562 CAUTION prior to step 7 "All condenser... level instruments/indicators are pneumatic and do not provide accurate indication on a loss of instrument air", and prior to step 10 "Travelling screen differential pressure instruments/indicators are pneumatic and do not provide accurate indication on a loss of instrument air".

Technical Reference(s): AOP 3562, Steps 7 and 10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-03939 Describe the major action categories contained within AOP 3562. (As available)

Question Source: New

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	79
	Tier #	2
	Group #	2
	K/A #	086.K4.04
	Importance Rating	3.5

Proposed Question:
A deep seated fire started in the computer room, and the Halon system automatically actuated 10 minutes ago. The crew desires to enter the computer room in order to inspect for damage.

How can the crew enter the computer room in accordance with the Halon related precautions of OP 3341B, "Fire Protection Halon System"?

A. The crew commences ventilating the computer room, and three men enter the area 15 minutes later.

B. One man enters the computer room wearing a SCBA. A second man waits outside the room as a safety person.

C. Two men enter the computer room, with each of them wearing a self contained breathing apparatus.

D. Two men enter the computer room wearing canister type masks. A third man waits outside the room as a safety person.

Proposed Answer: C

Explanation (Optional):
"A" is wrong since the space should be kept sealed for 30 to 60 minutes to ensure extinguishment of a deep seated fire, and the fire must be completely extinguished prior to ventilating the area. In the presence of heat, Halon decomposes and forms acrid byproducts, posing a hazard to personnel. Therefore, the area must not be entered alone ("B" wrong), and SCBAs ("C" is correct and "D" wrong) must be worn, since canister type masks only remove particulates, and Halon is a gas.

Technical Reference(s): OP 3341B, section 3 (Precautions) (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04565 Describe the major administrative or procedural precautions and limitations placed on the operation of the Halon Fire Protection System, including the basis for each. (As available)

Question Source: Bank # 74349

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.5, 41.10

Comments:

Examination Outline Cross-reference:		
	Question #	80
	Tier #	2
	Group #	3
	K/A #	008.A4.05
	Importance Rating	2.5

Proposed Question:

Initial Conditions:

- The plant is being cooled down on RHR to MODE 5 per the ACTION of LCO 3.7.3.
- Only the "A" Train of RPCCW is available, and it is supplying the "A" RHR heat exchanger.

Current Conditions:

- The problem with the "B" Train of RPCCW has been corrected.
- The "A" RPCCW Train is supplying RHR.
- The RO is preparing to start the "B" RPCCW pump per OP 3330A, "Reactor Plant Component Cooling Water".

What is the minimum preferred load that should be available for starting the "B" RPCCW Pump, and how will the other major heat loads be divided between the RPCCW Trains?

A. 2000 gpm of load should be available, and the "B" RPCCW train will be used to supply both the fuel pool cooler and a CDS chiller.

B. 2000 gpm of load should be available, and the "B" RPCCW train will supply the fuel pool cooler while the "A" Train will continue to supply the CDS chiller.

C. 3000 gpm of load should be available, and the "B" RPCCW train will be used to supply both the fuel pool cooler and a CDS chiller.

D. 3000 gpm of load should be available, and the "B" RPCCW train will supply the fuel pool cooler while the "A" Train will continue to supply the CDS chiller.

Proposed Answer: A

Explanation (Optional):
The minimum preferred load for starting an RPCCW pump is 2000 gpm ("C" and "D" wrong). The option for sharing loads between RPCCW trains is one train supplying RHR while the other train supplies the other two major loads ("A" correct, "B" wrong).

Technical Reference(s): OP 3330A, Note prior to step 4.2.1 (Attach if not previously provided)
OP 3330A, step 4.16.4
OP 3330A, Attachment 1

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04154 Describe the operation of the Reactor Plant Component Cooling System under the following... Plant Cooldown... (As available)

Question Source: New
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.7

Comments:

Examination Outline Cross-reference:		
	Question #	81
	Tier #	2
	Group #	3
	K/A #	041.K4.05
	Importance Rating	2.7

Proposed Question:
With reactor power at 19% and a plant startup in progress per OP 3203 "Plant Startup", the following sequence of events occurs:

1. The BOP operator closes the main generator output breaker.
2. The BOP operator starts picking up load on the turbine, increasing load to 50 MWe.

What will be the response of the steam dump system to this operation?

A. All steam dump valves will remain closed, since they are not armed.

B. All steam dump valves will remain closed, since they were closed just prior to closing the Generator output breaker.

C. The partially open steam dump valves will throttle closed, responding to decreasing main steam header pressure.

D. The partially open steam dump valves will throttle closed, responding to decreasing Reactor Coolant System Tave.

Proposed Answer: C

Explanation (Optional):
Steam dumps are in the steam pressure mode per OP 3203, step 4.3.1, so they are already armed ("A" wrong), and responding to Main Steam Pressure Transmitter 3MSS-PT507, which will be decreasing as the turbine draws steam ("C" correct, "D" wrong). "A" and "D" are plausible, since in the Tave Mode these could be true. The crew has placed "artificial load" on the steam dumps ("B" wrong) to allow placing the main generator on line with minimal impact on RCS Tave.

Technical Reference(s): OP 3203, step 4.3.1 (Attach if not previously provided)
Functional Dwg # 10

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05302 Describe the operation of the steam dump system when in the steam pressure mode of operation... (As available)

Question Source: Modified Bank # 75481 Parent Attached
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.7, 41.10
Comments:

Original Question 75481

With reactor power at 19% and a plant startup in progress per OP 3203 "Plant Startup", the following sequence of events occurs:

1. The BOP operator closes the main generator output breaker.
2. Turbine load has just been increased to close the steam dump valves.
3. Turbine first stage pressure transmitter 3MSS-PT506 fails high, with PT505 selected on MB7.

What will be the response of the steam dump system to this failure?

A. All steam dump valves will remain in their present position.

B. The 3 cooldown dumps fully open only, cooling down the RCS to 553°F, whereafter the 3 cooldown dumps close.

C. All steam dumps fully open, cooling down the RCS to 553°F, whereafter the steam dumps all close.

D. All steam dumps fully open, resulting in a low PZR pressure reactor trip and safety injection.

Answer: A

Examination Outline Cross-reference:		
	Question #	82
	Tier #	2
	Group #	3
	K/A #	045.K5.23
	Importance Rating	2.8

Proposed Question:
With the plant at 80% power, the crew is preparing to raise power to 100% on the turbine load limiter at 3% per hour. The RO/STA have gathered the following data:

- The expected change in reactivity due to power defect is -350 pcm.
- Rods are in auto with 175 pcm of integral rod worth remaining to be added by Control Bank "D".
- It is predicted that Xenon concentration will change from -2550 pcm to -2700 pcm over the course of the power change.
- RCS Boron concentration is 550 ppm.
- Burnup is 14000 MWD/MTU.
- RE desires to have rods fully out when 100% power is reached.

Using the curve and nomograph attached to this exam, approximately how much dilution water will have to be added to the RCS during the course of the up-power?

A. 3,000 gallons

B. 6,000 gallons

C. 9,000 gallons

D. 12,000 gallons

Proposed Answer: B

Explanation (Optional):
Rods and boron dilution will have to overcome -350 pcm power defect, and -150 pcm Xenon during the power increase. Rods will add +175 pcm leaving dilution to cover the remaining 325 pcm. Boron Worth is -6.77 pcm/ppm. 325/6.77 = 48 ppm dilution. This requires about 6000 gpm.

Technical Reference(s): Curve RE-F-02 (Attach if not previously provided)
3304C, Att. 5

Proposed references to be provided to applicants during examination: Curve RE-F-02, nomograph 3304C, Att. 5

Learning Objective: MC-04202 Describe the operation of the Chemical and Volume Control System under normal, abnormal, and emergency operating conditions. (As available)

Question Source: New
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.41.5
Comments:

Examination Outline Cross-reference:	Question #	83
	Tier #	2
	Group #	3
	K/A #	078.K2.01
	Importance Rating	2.9

Proposed Question:
An electrical fault occurs in the "B" Train 4160 volt bus tie breaker, resulting in a reactor trip and a loss of both 34B and 34D.

What will be the status of instrument air (IAS) during the performance of ES-0.1 "Reactor Trip Response"?

A. Both instrument air compressors are still available.

B. The "A" instrument air compressor will be running, but the "B" instrument air compressor has been lost.

C. Both IAS compressors will be lost, but the Service Air compressor will maintain IAS system pressure.

D. Both of the instrument air compressors and the service air compressor have been lost.

Proposed Answer: D

Explanation (Optional):
The power supply to the "A" IAS compressor is via 34B ("A" and "B" wrong), and the power supply to the "B" compressor is via 34D. The power supply to the service air compressor is via 34B ("C" wrong, "D" correct). "A" is plausible, since both IAS compressors receive power from the same train. "B" is plausible, since almost all equipment at Millstone 3 is powered from opposite trains. "C" is plausible, since the SAS compressor is not labeled with a train designator.

Technical Reference(s): Form OP 3332A-004 (Attach if not previously provided)
Form OP 3332C-3

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05321 Describe the operation of the following plant air systems components... Service Air Compressor... Instrument Air Compressors... (As available)

Question Source: New

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.7

Comments:

Examination Outline Cross-reference:	Question #	84
	Tier #	3
	Group #	1
	K/A #	GEN.2.1.1
	Importance Rating	3.8

Proposed Question:
The plant is being started up in accordance with OP 3203 "Plant Startup".

According to the Reactivity Management Standards, Attachment 3 of MP-14-RXM-PRG "Reactivity Management", which of the following is a standard which must be observed during the startup?

A. The operator in control of feedwater announces every significant feed flow change.

B. During turbine load changes the Unit Supervisor is notified of every Load Set/Load Limit adjustment.

C. During an unexpected plant transient, the RO uses control rod motion to raise primary temperature.

D. During an extended blended make-up, the RO will not leave the controls to acknowledge an expected annunciator on Main Board 1.

Proposed Answer: A

Explanation (Optional):
"A" is correct, Att. 3, Standard 2.d
"B" is wrong, Att. 3, Standard 2.c states that the Unit Supervisor does not have to be notified of every Load Set/Load Limit adjustment
"C" is wrong, Att. 3, Standard 10 states that control rod motion shall not be used to attempt to raise primary temperature.
"D" is wrong, Att. 3, Standard 8.a states that exceptions are granted for extended make-ups provided the RO frequently monitors the operation.

Technical Reference(s): MP-14-RXM-PRG Reactivity Management Standards, Attachment 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-06342 Master Reactivity Management Principles as outlined in the Reactivity Management Program Manual. (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.10
Comments:

Examination Outline Cross-reference:		
	Question #	85 (SRO)
	Tier #	3
	Group #	1
	K/A #	GEN.2.1.7
	Importance Rating	4.4

Proposed Question:
The Plant is in Mode 3 with a cooldown in progress in accordance with OP 3208 "Plant Cooldown". Due to a Tech Spec ACTION requirement, the crew is attempting to cooldown at the maximum allowed administrative cooldown rate limit. The following data has been logged over the last hour:

TIME	RCS TEMP	RCS PRESS
1500	549°F	2075 psia
1515	534°F	1700 psia
1530	517°F	1500 psia
1545	502°F	1375 psia
1600	489°F	1250 psia

Which of the following actions should be taken at Time 1600?

A. Maintain current cooldown rate, since it is at the administrative limit.

B. Decrease the cooldown rate, since it exceeds the administrative limit, but not the Tech Spec limit.

C. Stop the cooldown, since it exceeds both the administrative limit and the Tech Spec limit.

D. Increase the cooldown rate, since it is below the administrative limit.

Proposed Answer: D

Explanation (Optional):
Step 4.2.3.d requires that the elapsed time between the current and previous readings be used to calculate the cooldown rate and used to adjust the cooldown, and includes a check over the last hour as well. The administrative limit is 75°F in any one hour period, or 1.25°F per minute. Cooldown over the last hour was 60°F, and DT for cooldown is currently 13°F in 15 minutes, or 0.87 °F/min. Based on plant conditions the cooldown rate should be increased to approx. 1.25°F/min.

Technical Reference(s): SP 3601G, step 4.2.3.d & e. (Attach if not previously provided)
Form 3601G.2-1, pages 3 & 4
OP 3208, step 4.2.8

Proposed references to be provided to applicants during examination: Tech Spec sections 3/4

Learning Objective: MC-04837 The crew operates the plant in compliance with all applicable plant procedures and technical specifications (As available)

Question Source: Bank # 69844

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.43.5

Comments:

Examination Outline Cross-reference:	Question #	86 (SRO)
	Tier #	3
	Group #	1
	K/A #	GEN.2.1.12
	Importance Rating	4.0

Proposed Question:

With the MDMFP out of service, a rapid downpower is conducted to 50% power due to the pending loss of a turbine driven main feed pump.

After completion of the downpower, the following sequence of events occurs:

1. The RO notices that two control bank "D" rods did not insert with the others.
2. After 1 hour, the crew has <u>not</u> been able to withdraw the remaining bank "D" rods back to within 12 steps of the misaligned rods.
3. I&C has determined that both rods <u>are</u> trippable.

What Technical Specification ACTION is required?

A. The plant must be in HOT STANDBY within 6 hours of the discovery of the problem.

B. Initiate action within 1 hour to be in HOT STANDBY within the next 6 hours.

C. Power ops may continue if the rods are declared inoperable, SDM requirements are met, and power is reduced below 75% within the next hour.

D. Power operation may continue if the inoperable rods are restored to OPERABLE status within 72 hours.

Proposed Answer: A

Explanation (Optional): "A" is correct per TS 3.1.3.1.d. "B" is wrong since 3.0.3 is less restrictive than 3.1.3.1.d, which covers the condition. "C" is wrong since these are ACTIONs for ONE rod inoperable in 3.1.3.1.b. "D" is wrong, since this ACTION is taken in 3.1.3.1.c only if the crew was successful in realigning the bank to the rods.

Technical Reference(s): Tech Spec 3.1.3.1. (Attach if not previously provided)

Proposed references to be provided to applicants during examination: Tech Spec sections 3/4

Learning Objective: MC-03904Given a plant condition which requires the use of AOP 3552, identify applicable Technical Specification action requirements. (As available)

Question Source: Bank # 74491

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.43.2

Comments:

Examination Outline Cross-reference:		
	Question #	87
	Tier #	3
	Group #	1
	K/A #	GEN.2.1.13
	Importance Rating	2.9

Proposed Question:
Two Unit-3 Operations personnel have been assigned to escort 10 visiting people while giving them a tour of the Transformer and Switchgear areas of Unit-3. The following conditions exist:

- The only vital area that the visitors have been given authorization for entry is the switchgear area.
- The tour is progressing from the transformer area in the yard to the East Switchgear Room.
- Prior to entering the switchgear room, one of the escorts is paged, and is required to return to the control room.

What action is in accordance with SC-1 "Access and Egress Control"?

A. The one remaining escort may take escort responsibility for all 10 visitors and continue the tour into the switchgear area.

B. The one remaining escort may take 5 visitors into the switchgear area, while the other escort takes the other 5 visitors with him into the control room.

C. The one remaining escort may take escort responsibility for all 10 visitors and remain outside of the switchgear room until the second escort returns.

D. Both escorts must take the visitors outside the protected area prior to the one escort leaving for the control room.

Proposed Answer: C
Explanation (Optional): An escort is required to maintain both observation and control of visitors. The injured escort can not walk, therefore can not maintain observation and control of the visitors. Escort/ visitor ratios are 10/1 for non vital areas and 5/1 for vital areas. Since the tour was not within a vital area at the time of the accident. One person is allowed to escort the visitors as long as they do not enter a vital area. "1" is incorrect because of the 5/1 rule. "2" is incorrect because the injured person does not fulfill the definition requirements of an escort. "3" is incorrect because 5 visitors are left with the injured person who cannot be an escort.
Technical Reference(s): SC-1 Sections 1.6.5 and1.10 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: GE-00177 State your responsibilities in the protected area when: Escorting a visitor... (As available)

Question Source: Bank # 64349

Question Cognitive Level:	Memory or Fundamental Knowledge
10 CFR Part 55 Content:	55.41.10 55.43.5

Comments:

Examination Outline Cross-reference:		
	Question #	88
	Tier #	3
	Group #	1
	K/A #	GEN.2.1.25
	Importance Rating	3.1

Proposed Question:
The plant has been at 100% power for several months with the MDMFP unavailable when the following sequence of events occurs:

8/6/02, 0330: A rapid downpower to 50% is conducted due to a failed seal on the "A" TDMFP.
8/8/02, 0830: The seal has been replaced, and an up-power is commenced at 3%/hr to 80%.
8/8/02, 1900: With power at 80%, a calorimetric is in progress when the new seal fails. A rapid downpower is again performed to reduce power to 50%.
8/8/02, 1906: Power is steady at 50%.
8/9/02, 2030: The seal is replaced, and the crew is preparing to raise power from 50% to 100%.

Using Attachment 4 of OP 3204 "At Power Operation", attached to this exam, what is the maximum rate of power increase allowed during the up-power?

A. 3%/hr until 72 cumulative hours of operation at 100% power has been attained.

B. 10%/hr up to 80% power, and then 3%/hr from 80% to 100% power.

C. 10%/hr up to 90% power, and then 3%/hr from 90% to 100% power.

D. 10%/hr up to 100% power.

Proposed Answer: C
Explanation (Optional): **NOTE: This is a new table within OP 3204.** "C" is correct, since power has been at 100% for at least 72 hours out of the 7 day operating period, and the bottom row of Attachment 4 is applicable. "A", "B", and "D" are plausible, since 3% and 10% are the increase rates available for selection from this attachment, and power had been returned temporarily to 80% during the first up-power.
Technical Reference(s): OP 3204, Attachment 4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: OP 3204, Attachment 4

Learning Objective: MC-03397 Describe the major action categories contained within the OP 3204 procedure. (As available)

Question Source:	New
Question Cognitive Level:	Comprehension or Analysis
10 CFR Part 55 Content:	55.41.10
	55.43.5

Comments:

Examination Outline Cross-reference:	Question #	89 (SRO)
	Tier #	3
	Group #	1
	K/A #	GEN.2.1.33
	Importance Rating	4.0

Proposed Question:
With the plant at 100% power, the following sequence of events occurs:

1. Charging flow had been increasing over a period of time and has stabilized.
2. PRT level is slowly increasing.
3. Engineering and operations personnel have determined BOTH pressurizer PORVs are leaking excessively, but well within the capacity of the running charging pump.
4. Leakage is determined to be approximately 2 gpm (equivalent) per valve.

What actions, if any, are required to be taken per technical specifications?

A. No actions are required to be taken by technical specifications.

B. Close the block valves for BOTH PORVs, with power maintained to the block valves.

C. Restore the PORVs within 7 days, or depressurize and vent the RCS within the next 12 hours.

D. Reduce RCS leakage to within limits within 4 hours or be in at least HOT STANDBY within 6 hours.

Proposed Answer: B

Explanation (Optional):
PORV inoperability due to seat leakage does not prevent automatic or manual use. Therefore, the block valve may be closed but the action requires power to be maintained to the valve ("B" correct). The EOPs provide guidance to assure that the block valves would be opened early in the event, ensuring that the PORVs would be available to mitigate the event. "A" is wrong, since the PORVs are leaking excessively. "C" is wrong since the COPPS function of the PORVs per LCO 3.4.9.3 is not required in MODE 1. "D" is wrong, but plausible, since this action is required if the leakage exceeded identified leakage rates per LCO 3.4.6.2.

Technical Reference(s): Tech Spec 3/4.4.4 (Attach if not previously provided)
Tech Spec 3/4.4.6.2
Tech Spec 3/4.4.9.3

Proposed references to be provided to applicants during examination: Tech Spec section 3/4

Learning Objective: MC-06063 Determine applicable LCO action requirements for a given plant condition or event (As available)

Question Source: Bank # 73762
Question Cognitive Level: Comprehension or Analysis
10 CFR Part 55 Content: 55.43.2
Comments:

Examination Outline Cross-reference:	Question #	90 (SRO)
	Tier #	3
	Group #	2
	K/A #	GEN.2.2.11
	Importance Rating	3.4

Proposed Question:
Which of the following is required in order to ensure strict control of temporary modification tags?

A. The jumper tags must be hung by a licensed operator.

B. Independent or Dual verification as required is performed when installing the tags.

C. The on-shift SM, on-shift US, or designated SRO must approve the temporary modification prior to hanging the tags.

D. Caution tags shall be used and the clearance number noted in the "Comments" section of the Jumper Device Control Sheet.

Proposed Answer: B

Explanation (Optional):
A is wrong since the installer does not have to be licensed (i.e. may be from the department requesting the jumper). B is correct since verification (dual or independent) is required. C is wrong since the SM alone approves the installation when the jumper is installed. D is wrong since caution tags may not be required.

Technical Reference(s): WC-10 Attachment 4, Temporary Modification Control Sheet (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05104 Outline the process for Temporary Modification installation. (As available)

Question Source: Bank # 72387
Question History: Previous NRC Exam
Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.10
55.43.3

Comments:

Examination Outline Cross-reference:	Question #	91
	Tier #	3
	Group #	2
	K/A #	GEN.2.2.25
	Importance Rating	3.7

Proposed Question:
The crew is responding to a dropped rod, and the QPTR is calculated to be 1.03. The SM refers to Tech Spec 3.2.4 QUADRANT POWER TILT RATIO.

The SM determines that the crew must reduce THERMAL POWER at least 3% from RATED THERMAL POWER for each 1% of QPTR in excess of 1 within 2 hours.

What is the basis of the 2 hour allowance prior to the power reduction requirement?

A. Allow for boration to regain Shutdown Margin.

B. Heat flux hot channel factors could be violated after 2 hours.

C. Axial peaking factors could be exceeded after 2 hours.

D. Allow for identification and correction of a dropped or misaligned rod.

Proposed Answer: D

Explanation (Optional):
"D" correct from Tech Spec bases: "the 2-hour time allowance for operation with a tilt condition greater than 1.02 but less than 1.09 is provided to allow identification and correction of a dropped or misaligned control rod."

Technical Reference(s): Tech Spec basis 3/4.2.4 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05227 Describe the major administrative or procedural precautions and limitations placed on the operation of the NIS system, and the basis for each (As available)

Question Source: Bank # 65077
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.43.2
Comments:

Examination Outline Cross-reference:	Question #	92 (SRO)
	Tier #	3
	Group #	2
	K/A #	GEN.2.2.27
	Importance Rating	3.5

Proposed Question:
You are the Refueling Senior Reactor Operator on-duty in Containment during Core Load.

Which of the following conditions would allow Core Alterations to continue (consider each condition independently)?

A. The RHR flow is deliberately suspended for 45 minutes after running for the previous 8 hours.

B. Communications between the Refueling Floor and the Control Room interrupted for 3 minutes.

C. Source Range audio countrate is lost in CTMT but available in the control room.

D. The Refuel SRO is absent from the Refuel floor while replacing sources.

Proposed Answer: A

Explanation (Optional): "A" is correct since OP 3210B allows RHR flow to be deliberately suspended for **1 hour** in the last 8 hour period if no dilution in progress (OP 3210B, Refueling Operations 3.10). "B" is wrong, but plausible since the "temporary" nature may lead candidate to suppose the interruption is permissible (3.13). "C" is wrong since LCO 3.9.2 requires audible countrate in CTMT. "C" is plausible since audible countrate is still available in the control room. "D" is wrong, but plausible since the sources may appear not to be a significant core alteration.

Technical Reference(s): OP 3210B Section 3 (Attach if not previously provided)
Tech Spec LCO 3.9.2

Proposed references to be provided to applicants during examination: Tech Spec section 3/4

Learning Objective: MC-06495 Describe the stop work requirements with regards to fuel movement... (As available)

Question Source: Modified Bank # 75651
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.43.6
Comments:

Original 75651

You are the Refueling Senior Reactor Operator on-duty in Containment during Core Load.

Which of the following conditions would allow Core Alterations to continue (consider each condition independently)?

A. Communications between the Refueling Floor and the Control Room are temporarily (<5 minutes) interrupted.

B. The RHR flow is deliberately suspended for 2 hours in the last 8 hour period.

C. The RHR flow rates increase to 3,000 gpm per pump.

D. The Refuel SRO is absent from the Refuel floor while replacing sources.

Answer: C

Examination Outline Cross-reference:		
	Question #	93 (SRO)
	Tier #	3
	Group #	2
	K/A #	GEN.2.2.29
	Importance Rating	3.8

Proposed Question:
In accordance with MP-14-OPS-GDL02 "Operations Standards" and OP 3210A "Refueling Preparations", which of the following evolutions requires that the Refueling SRO be present on the Refueling Floor?

A. Moving the Upper Guide Structure from or into the reactor vessel

B. Installing or removing the Fuel Transfer Tube blind flange

C. Start filling the reactor vessel from the RWST using the RHR system

D. Initial Reactor Vessel Stud detensioning

Proposed Answer: A

Explanation (Optional):
"A" is correct, Operations Standards, MP-14-OPS-GDL02, Attachment 6, sheet 16 of 21
"B" is wrong, blind flange removal occurs at step 4.1.7 of OP 3210A, Refueling Preparations, before step 4.1.17 which stations the Refueling SRO and is NOT identified as a CORE ALT.
"C" is wrong, filling the reactor vessel from the RWST occurs at step 4.3.8 or 4.3.9 of OP 3210A, Refueling Preparations, and does not require stationing the Refueling SRO and is NOT identified as a CORE ALT.
"D" is wrong, detensioning occurs at step 4.1.6 of OP 3210A, Refueling Preparations, before step 4.1.17 which stations the Refueling SRO and is NOT identified as a CORE ALT.

Technical Reference(s): Operations Standards, MP-14-OPS-GDL02 (Attach if not previously provided)
OP 3210A, Refueling Preparations

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04544 Describe the following: (As available)
A. Core Alterations and what specifically marks the start of Core Alterations
B. Who has authority to direct and/or approve all core component movements
C. Who has authority to terminate fuel handling operations due to a discrepancy or safety concern and which type of discrepancies warrant the termination of fuel handling operations
D. When the reactor vessel head is considered to be tensioned

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.43.6
Comments:

Examination Outline Cross-reference:	Question #	94
	Tier #	3
	Group #	3
	K/A #	GEN.2.3.1
	Importance Rating	3.0

Proposed Question:
A maintenance employee at Millstone has the following exposure records for the current year:

Total Effective Dose Equivalent (TEDE): 0.94 Rem
Dose to the eyes: 18.3 Rem

Which dose limits, if any, has this worker exceeded?

A. No limits have been exceeded.

B. Millstone administrative TEDE limit has been exceeded only.

C. Federal TEDE limit has been exceeded.

D. Federal dose limit to the eyes has been exceeded.

Proposed Answer: D

Explanation (Optional):
TEDE is less than the Millstone Admin limit of 1 Rem/year TEDE ("B" wrong), and less than the federal limit of 5.0 Rem/year ("C" wrong). "D" is correct, since the dose limit for eyes is 15 Rem/year. "A" is plausible since 18.3 Rem is < limit for extremities (50 R).

Technical Reference(s): Rad Worker Training Manual, Ch 3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: GE-00059 State the Federal radiation limits... GE-00064 State the plant administrative guidelines for radiation dose. (As available)

Question Source: Modified Bank # 75637 Parent attached
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.12
Comments:

Original question 75637

A maintenance employee at Millstone has the following exposure records for the current year:

Committed Effective Dose Equivalent (CEDE):	0.95 Rem
Deep Dose Equivalent (DDE):	0.06 Rem
Dose to the extremities:	18.3 Rem

Which dose limits, if any, has this worker exceeded?

A. No limits have been exceeded.

B. Millstone administrative TEDE limit has been exceeded only.

C. Federal TEDE limit has been exceeded.

D. Federal dose limit to extremities has been exceeded.

Answer: B

Examination Outline Cross-reference:		
	Question #	95 (SRO)
	Tier #	3
	Group #	3
	K/A #	GEN.2.3.9
	Importance Rating	3.4

Proposed Question:
Initial conditions:

- The plant has just been cooled down at the start of a refueling outage.
- The crew is preparing to start the Containment Purge System in the "Unfiltered" mode of operation.
- The plan is to open the containment access hatch shortly.
- Outside air temperature is 55°F.

What will be the desired Containment Purge System lineup with the Containment Access Hatch open?

A. One supply HVU and one exhaust fan running to prevent excessively cooling down CTMT.

B. One supply HVU and two exhaust fans running to keep air flow into CTMT through the access hatch.

C. Two supply HVUs and one exhaust fan running to keep air flow out of CTMT through the access hatch.

D. Two supply HVUs and two exhaust fans running to maximize air flow in CTMT.

Proposed Answer: B
Explanation (Optional): One supply HVU and two exhaust fans are desired to be running to keep air flow into CTMT through the access hatch ("B" correct, "C" and "D" wrong) "A" is wrong, since hot water heating is modulated to the HVUs to maintain 70°F outlet temperature. "A" is plausible, since there is a minimum desired CTMT temperature, and only one train is allowed in the filtered mode. "D" is plausible since operating with 2 trains of purge is allowed with the CTMT hatch closed.
Technical Reference(s): OP 3313F, section 4.1 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04261 Describe the major administrative or procedural precautions placed on the operation of the CTMT ventilation systems, and the basis for each. (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.43.4
Comments:

Examination Outline Cross-reference:	Question #	96
	Tier #	3
	Group #	4
	K/A #	GEN.2.4.2
	Importance Rating	4.1

Proposed Question:
The crew is performing a plant startup per OP 3203 "Plant Startup" with reactor power at 4%.

Which condition will immediately result in an automatic reactor trip, requiring the crew to enter E-0 "Reactor Trip or Safety Injection"?

A. RCS pressure decreases to 1850 psia.

B. Pressurizer level increases to 90%.

C. 3MSS-PT505 fails high.

D. All four RCPs trip.

Proposed Answer: A

Explanation (Optional):
Pressurizer High Level, Pressurizer Low Pressure, and all loop flow trips are automatically blocked below P-7 [Turbine (P-13) and Reactor (P-10) < 10% power]. (B and D incorrect). Reactor trip on turbine trip is blocked below P-9 (~50% power). Failure of PT-505 would enable P-7 but not cause a reactor trip. (C incorrect). As pressure decreases to 1892 psia, SI is actuated. The SI signal generates a Reactor Trip Signal.

Technical Reference(s): Functional Dwgs 2, 4, 5, 6, and 16 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05493 Describe the operation of the following RPS controls and interlocks... Reactor Trip Signals... Protective Interlocks... (As available)

Question Source: Bank # 69344

Question Cognitive Level: Comprehension or Analysis

10 CFR Part 55 Content: 55.41.7

Comments:

Examination Outline Cross-reference:	Question #	97
	Tier #	3
	Group #	4
	K/A #	GEN.2.4.6
	Importance Rating	4.0

Proposed Question:
A small break LOCA has occurred and no charging or SIH pumps are running. The operating crew has transitioned to EOP 35 FR-C.1 "Response to Inadequate Core Cooling".

Which of the following lists the recovery strategies in the correct sequence for the condition?

A. Start ECCS, depressurize secondary, depressurize RCS, start RCPs.

B. Start ECCS, depressurize secondary, start RCPs, depressurize RCS.

C. Depressurize secondary, start ECCS, depressurize RCS, start RCPs.

D. Depressurize secondary, start ECCS, start RCPs, depressurize RCS.

Proposed Answer: B

Explanation (Optional):
FR-C.1 step 2: Verify ECCS flow, step 10 depressurizes all intact SGs to 140 psig, step 17 starts RCPs. Step 17 RNO Opens PZR PORV's if RCPs are running.

Technical Reference(s): FR-C.1 steps 2, 10, 17, 17 RNO (Attach if not previously provided)
FR-C.1 Bkgd Doc, "Major action categories (pg 7), and step 18

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04934 PRIORITIZE the operator-initiated recovery techniques that mitigate the consequences of a loss of core cooling (As available)

Question Source: Bank # 65036

Question Cognitive Level: Memory or Fundamental Knowledge

10 CFR Part 55 Content: 55.41.10
55.43.5

Comments:

Examination Outline Cross-reference:	Question #	98 (SRO)
	Tier #	3
	Group #	4
	K/A #	GEN.2.4.28
	Importance Rating	3.3

Proposed Question:
A hostile force gains access to the Protected Area and commits several acts of sabotage before taking refuge in the old Unit 1 Gas Turbine building where they are currently surrounded by security. The Unit 3 Shift Manager decides to implement a precautionary dismissal in response to this security event.

Which of the following items, if not completed, would delay the precautionary dismissal?

A. Notification of local law enforcement agencies is not completed.

B. Personnel accountability is not completed.

C. SERO activation is not completed.

D. A security assessment has not been completed.

Proposed Answer: D

Explanation (Optional):
"A" wrong: a good practice but not a procedural requirement.
"B" wrong: personnel accountability occurs after the dismissal. (step 2.1.6)
"C" wrong SERO activation should be considered but will not delay dismissal (step 2.1.1.c).
"D" correct, security assessment must be completed (step 2.1.1.a)

Technical Reference(s): MP-26-EPI-FAP08, Evacuation and Assembly (Attach if not previously provided)

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-05571 Describe the Shift Manager's responsibilities during a security event. (As available)

Question Source:	New
Question Cognitive Level:	Memory or Fundamental Knowledge
10 CFR Part 55 Content:	55.41.10
	55.43.5

Comments:

Examination Outline Cross-reference:	Question #	99 (SRO)
	Tier #	3
	Group #	4
	K/A #	GEN.2.4.36
	Importance Rating	2.8

Proposed Question:
A reactor trip has occurred involving a radiation release, an ALERT, C-1 has been declared, and SERO has been activated.

What actions are the responsibility of the chemistry technician once he arrives in the control room?

A. Recommend which repair teams will require HP accompaniment.

B. Access OFIS to obtain and provide data to the TIC on the status of the offsite dose release.

C. Perform the initial dose assessment using "IDA".

D. Conduct in plant surveys and sample analysis.

Proposed Answer: C

Explanation (Optional):
"A" is wrong since OSC responsibility. "B" is wrong, since the CRDC will be accessing OFIS and communication with the TIC. "C" is correct since this is the responsibility of the Chemistry Technician. "D" is wrong, since this is the responsibility of RMT1 (HP Tech).

Technical Reference(s): MP-26-EPI-FAP01, section 1.4.4 (Attach if not previously provided)
MP-26-EPI-FAP10, section 2.3 and Att. 2

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-02534, The Shift Manager and Unit Supervisor will perform all administrative actions necessary to protect the public in accordance with emergency plan procedures. (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.43.5
Comments:

Examination Outline Cross-reference:	Question #	100
	Tier #	3
	Group #	4
	K/A #	PLANT SPECIFIC
	Importance Rating	N/A

Proposed Question:
The crew is responding to a tube rupture, and the following sequence of events occurs:

0930 The crew enters E-3 "Steam Generator Tube Rupture".
0933 The RHR pumps are both stopped and placed in AUTO.
0939 The SIH pumps are both stopped and placed in AUTO.
0940 The "B" CHS pump is stopped and placed in AUTO.
0942 The normal charging flowpath is aligned.
0943 Both charging cold leg injection valves are closed.

In accordance with OP 3272 "EOP User's Guide", at what time is the foldout page "SI Reinitiation Criteria" initially in effect?

A. 0939

B. 0940

C. 0942

D. 0943

Proposed Answer: D

Explanation (Optional):
SI reinitiation criteria are not in effect until SI has been terminated. SI is considered terminated when ALL of the following have occurred: RHR Pumps stopped and in AUTO, SI pumps stopped and in AUTO, one charging pump running and aligned to the normal charging flowpath, and both charging pump cold leg injection valves closed ("D" correct). All distractors are plausible, since all of the actions are in accordance with E-3, and are involved with terminating SI.

Technical Reference(s): OP 3272, section 1.5 (Attach if not previously provided)
E-3, steps 12, 19-21

Proposed references to be provided to applicants during examination: None

Learning Objective: MC-04461 Explain the usage of foldout pages within the Emergency Operating Procedure network (As available)

Question Source: New
Question Cognitive Level: Memory or Fundamental Knowledge
10 CFR Part 55 Content: 55.41.10
55.43.5

Comments: